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November 21, 2012

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Ms. Alice Yeh
Remedial Project Manager
U.S. EPA Region II
290 Broadway
New York, New York 10007-4427

Re: Comments of the Lower Passaic River Study Area Site Cooperating Parties Group for the National Remedy Review Board

Dear Ms. Yeh:

The Lower Passaic River Study Area Site Cooperating Parties Group appreciates the opportunity to provide comments to the National Remedy Review Board and the Contaminated Sediment Technical Advisory Group (together, "NRRB"). Please include the enclosed comments with the package that Region 2 will be distributing to the NRRB members with respect to the current draft Remedial Investigation - Focused Feasibility Study ("Draft FFS"). Please also place the enclosed cover letter and comments in the administrative record for the Draft FFS.

Very truly yours,

William H. Hyatt, Jr.
Coordinating Counsel
Lower Passaic River Study Area
Site Cooperating Parties Group

cc. NRRB/CSTAG Members
CPG Members
Mr. Walter Mugdan, Division Director
Eric Schaaf, Esquire, Regional Counsel

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November 21, 2012

National Remedy Review Board
Contaminated Sediments Technical Advisory Group
US Environmental Protection Agency
c/o Ms. Amy Legare
1200 Pennsylvania Avenue, NW
Mail Code 5204P
Washington, DC 20460

Re: Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group with Respect to the Draft Remedial Investigation-Focused Feasibility Study

NRRB and CSTAG Members:

Enclosed are comments submitted on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group ("CPG") with respect to Region 2's proposed draft Remedial Investigation-Focused Feasibility Study ("Draft FFS"). Please take these comments into consideration in your review of the Draft FFS.

As described in these comments, in May 2007, the CPG entered into a settlement agreement with Region 2 to complete the National Contingency Plan ("NCP")-mandated remedial investigation/feasibility study ("RI/FS") of the 17-mile Lower Passaic River Study Area ("LPRSA"). The CPG has conducted that RI/FS on schedule and in compliance with Region 2 oversight and direction, and is scheduled to complete the study in 2015 at an estimated cost that will exceed $70 million. Region 2's proposal to issue the Draft FFS, which proposes a *final* remedy for eight of the 17 miles of the LPRSA, at a time when there is an ongoing RI/FS to select a remedy for the full 17-miles, is unprecedented and arbitrary and capricious. Region 2 has provided no justification for its actions in circumventing the NCP process by attempting to select a massive final remedy for the lower eight miles, particularly where there is no emergent circumstance or imminent threat to human health or the environment that could be addressed in the short-term by the Draft FFS remedies. Further, the remedy proposed under the Draft FFS may not be consistent with the final remedy to be selected for the entire 17-mile LPRSA as the result of an RI/FS that is so close to completion. The CPG has been unable to identify any other instance in which a focused feasibility study has been used to select a final remedy under these circumstances.

It is important to note that Tierra Solutions, Inc. and Occidental Chemical Corp., the entities with the responsibility for the 2,3,7,8-TCDD ("TCDD") contamination in the LPRSA, which accounts for the majority of the risk at the site, have withdrawn from the CPG. Thus, the CPG is currently made up of 70 companies, who bear no responsibility with respect to the Diamond Alkali Superfund Site, the source of the TCDD contamination, and are all likely to qualify for *de minimis* settlement treatment under existing EPA policies.

Moreover, as these comments establish, issuance of the Draft FFS would be arbitrary and capricious, and represent a clear error of judgment. The Draft FFS: is inconsistent with the NCP; flies in the face of current EPA principles and guidance for the management of contaminated sediments; fails to consider all available data collected and to be collected under the RI/FS; relies on an incomplete model that fails to replicate existing conditions or to produce reliable results and has not undergone peer review; and relies heavily on a flawed dredging pilot study, with the result that the predicted dredging production rates are significantly over-stated and the resulting durations of the project are significantly under-estimated.

The CPG is developing an alternative remedy that is consistent with the NCP, employs an adaptive management approach consistent with national sediment management principles and guidance, and considers all the data gathered and to be gathered under the RI/FS. NRRB should strongly recommend that Region 2 not issue the Draft FFS, but instead to allow the RI/FS to be completed to provide the basis for selection of the remedy. Region 2 should also be instructed to give full consideration to the NCP-consistent alternative remedy.

Thank you for your consideration of the attached comments.

Very truly yours,

William H. Hyatt, Jr.
Coordinating Counsel,
Lower Passaic River Study Area Site
Cooperating Parties Group

Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on Region 2's Draft Remedial Investigation-Focused Feasibility Study

PREFACE

The following comments are submitted by the Lower Passaic River Study Area ("LPRSA") Site Cooperating Parties Group (the "CPG") for consideration by the National Remedy Review Board and Contaminated Sediment Technical Advisory Group (together, the "NRRB") in its review of EPA Region II's ("Region 2" or the "Region") revised form of the Draft Remedial Investigation - Focused Feasibility Study (the "Draft FFS"). The EPA has refused to provide the Draft FFS to the CPG, despite repeated requests. Thus, these comments are based on the limited information the Region has made available to the public.

Nevertheless, the CPG has developed and is continuing to develop extensive data and other information in the course of completing the remedial investigation and feasibility study ("RI/FS") of the entire 17-mile length of the LPRSA. This data and other information has been collected and analyzed by the CPG under EPA oversight pursuant to a settlement agreement and administrative order on consent (the "RI/FS AOC"). In spite of mandating the CPG to conduct extensive and expensive testing, the Region has failed to consider all available RI/FS data, including the extensive data gathered by the CPG at River Mile ("RM") 10.9, where the CPG is conducting a time-critical removal action ("Removal Action") pursuant to another settlement with Region 2. Both the RI/FS and RM 10.9 data sets include extensive and detailed information that furthers the understanding of contaminant patterns in the Lower Passaic River (the "River") and illustrates the efficacy of a targeted, adaptive management approach to sediment remediation and risk reduction. These data also undermine the conclusions in the Draft FFS. Accordingly, consideration of this information is essential to the NRRB's evaluation of the Draft FFS and any proposed remedy, and the Region's refusal to consider this data highlights its arbitrary and capricious conduct.

Based upon information provided to stakeholders on October 12, 2012 (the "Stakeholder Summary"), it is assumed that Region 2 will propose two massive bank-to-bank remedial options in the Draft FFS, which are derived from incomplete and inadequate data, and thus technically infeasible. These comments are intended to provide a critical analysis of what is known about the Draft FFS, and to inform the NRRB about the ongoing work of the CPG to collect additional data and to evaluate remedial alternatives as part of the RI/FS. As part of that remedial alternatives evaluation, the CPG is developing an Alternative Remedy, discussed herein, that will be superior to the Draft FFS remedies because it will provide a comprehensive remedy for the entire 17 miles of the LPRSA; reduce sediment-related risks faster and more cost effectively; cause less resuspension and less disruption to the community; and be consistent with the NCP and current EPA guidance.

For ease of reference, these comments are organized as follows:

EXECUTIVE SUMMARY

Introduction. The CPG is comprised of 70 companies who are working cooperatively with Region 2 under three settlement agreements. A list of CPG members can be found at www.lowerpr.com. Significantly, the entities with the responsibility for the 2,3,7,8-TCDD ("TCDD") contamination in the LPRSA, which accounts for the majority of the risk at the site, have withdrawn from the CPG and refused to participate in the RM 10.9 settlement. Thus, Tierra Solutions, Inc. ("Tierra") and Occidental Chemical Corp. are no longer CPG members. The 70 remaining CPG members, none of whom has any responsibility with respect to the Diamond Alkali Superfund Site, the source of the TCDD contamination, are all likely to qualify for *de minimis* settlement treatment under existing EPA policies.

The Draft FFS is premature and is scientifically and technically unsound based upon the extensive knowledge and analysis the CPG has developed regarding the LPRSA in conducting the RI/FS. The Draft FFS is also legally indefensible due to its inconsistency with the National Contingency Plan ("NCP") and current EPA guidance.

Region 2 has provided no legal, factual, technical or scientific justification for its actions in circumventing the NCP process by attempting to select a massive final remedy for the lower eight miles of the LPRSA, prior to completion of the RI/FS that the Region ordered the CPG to undertake for the entire LPRSA. That RI/FS includes the eight miles which are the subject of the Draft FFS. EPA has not identified any imminent risk that would be addressed in the short-term by the Draft FFS remedies. Furthermore, the Region's extreme departure from the NCP procedures is based upon flawed assumptions, which should be reconsidered in light of the following: (1) concentrations of TCDD above RM 8 are higher than those in the lower eight miles and will recontaminate any remedy in the lower River; (2) the greater portion of the legacy sediments in the lower eight miles are stable and are not contributing to risk; (3) natural recovery has occurred; (4) data collected by the CPG pursuant to the Region's direction confirms the foregoing; (5) an NCP-compliant process is underway to aid in selection of a remedy for the entire 17-miles; (6) the Draft FFS is inconsistent with the NCP process for selection of a *final* remedy; and (7) the Draft FFS cannot be an "early action" under the NCP as it cannot be accomplished within the five year period contemplated by EPA guidance but will take between 20 to 30 years. Furthermore, the principal risk identified by Region 2 relates to the consumption of contaminated fish or shellfish; a risk currently being addressed by institutional controls. The Draft FFS alternatives would do nothing to address this risk in the short-term or alleviate the need for continuing institutional controls.

The Region has made a number of unfounded and scientifically unsupported assumptions to support the Draft FFS remedies, such as the absence of continuing natural

recovery when the available data (including the most current data that it has failed to consider in the Draft FFS) and its own model show that natural recovery does occur. For the reasons discussed below, the CPG is unwilling to perform or pay for any remedy selected on the basis of the Draft FFS. Instead, the CPG is developing a workable and implementable alternative addressing targeted areas that are potential sources of contamination which are inhibiting the natural recovery of the River and leaving undisturbed stable areas of the sediment bed that are not potential continuing sources (the "Alternative Remedy"). The Alternative Remedy will be screened and evaluated by the CPG in the FS against the NCP remedy selection criteria, and is expected to achieve reductions in human health and ecological risk comparable to the Draft FFS remedies, much faster and with less disruption to surrounding communities than the Draft FFS alternatives.[1]

The Draft FFS is scientifically and technically unsound. Region 2 has ignored data it required the CPG to collect and analyze during the RI/FS process. Indeed, Region 2 is continuing to demand that the CPG gather additional data to complete the RI/FS, but these data obviously cannot have been considered in the Draft FFS. The NRRB should urge Region 2, as it did in the past, to consider all the data collected and to be collected by the CPG in the RI/FS and to permit the CPG to complete the RI/FS before any long-term remedial actions, such as the Draft FFS remedies, are given further consideration. This is especially critical now, given that the Region has termed this a *final* remedy for the lower eight miles of the LPRSA.

Region 2's failure to evaluate all the available data has led it to reach incorrect conclusions. For example, contrary to the allegation provided in the Stakeholder Summary that the highest surface concentrations of contaminants in the LPRSA are found in the lower eight miles, the data collected under the RI/FS AOC show that the highest surface concentrations of contaminants are actually found in selected areas of RM 7 to 12. Those high concentrations are in fact a potential source of contamination for the area covered by the Draft FFS and will be addressed by the Alternative Remedy. Had Region 2 considered all the available data, the conclusions drawn in the Draft FFS would likely have been different and the superiority of a targeted approach would have become clear. Indeed, these data demonstrate why a comprehensive remedy for the entire 17 miles of the LPRSA should be selected pursuant to the RI/FS, rather than the NCP-inconsistent approach taken in the Draft FFS of considering alternatives for only eight of the 17 miles of the LPRSA.

As a further example, Region 2 concluded in the Stakeholder Summary that natural recovery of contaminated sediments in the LPRSA has ceased, even though the data and its own modeling show natural recovery occurring at a substantial rate between 1995 and 2008. Region 2's sediment transport model is understood to show no continuing infilling in the River, leading the Region to conclude that natural recovery is no longer occurring; whereas, the preliminary CPG model - and actual fish tissue sampling results - show continuing infilling with resultant natural recovery. The data support the CPG modeling results and not the Region's modeling results, and the positive impact of continuing natural recovery should have been considered by the Region in preparing the Draft FFS. Furthermore, Region 2's model is not yet producing reliable results, cannot reproduce existing conditions, lacks a bioaccumulation component, and has not yet undergone the anticipated and scheduled peer review process required by EPA guidance. Indeed, the Region's peer review of its model is not scheduled to be completed until August 2013. This highlights how arbitrary and capricious the Region's actions are in prematurely reaching the conclusions in the Draft FFS. Moreover, the Region has not completed its modeling report. Under these circumstances, Region 2's model should not be used as a decision-making tool.

[1] The Alternative Remedy is not an offer; rather it is part of the ongoing FS evaluation required pursuant to the RI/FS AOC.

The Draft FFS also relies heavily on a flawed dredging pilot study (designed and implemented in 2005), with the result that the predicted dredging production rates are significantly over-stated and the resulting durations of the project are significantly under-estimated. Reliance by Region 2 on the flawed dredging pilot study is arbitrary and capricious because the study failed to account for the actual field conditions (such as actual bridge clearances) in the areas to be dredged. To demonstrate, the Draft FFS predicts that the dredging for the active remedial alternatives will take six to 11 years. Using more realistic reach-specific information, however, the duration times are more likely two to three times longer, or 20 to 30 years. The dredging pilot study was not representative of actual field conditions and did not take into account the realities of this urban sediment site. As a result, the Draft FFS remedies will take years, and in some cases, decades longer to complete than the Draft FFS predicts, with consequent dramatic increases in resuspension, disruption to local communities and estimated costs. These extreme final remedies are being contemplated at a time when the RI/FS is expected to be completed in slightly over two years.

Region 2 and the CPG have developed fundamentally different conceptual site models ("CSMs") of the LPRSA. Region 2's CSM does not provide for continued natural recovery through ongoing infilling, and therefore is leading the Region to consider only large scale remedies. By contrast, the CPG's CSM[2] is based on the extensive data gathered by the CPG in the course of the RI/FS, showing definite patterns to the contamination. Those patterns lead to the development of more tailored remedies that can be implemented more quickly, with less resuspension and less disruption to surrounding communities. The CPG approach follows the adaptive management recommended in EPA's 2002 Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites, OSWER Directive 9285.6-08 (Principles) and EPA's 2005 Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, OSWER Directive 9355.0-85 (Sediment Guidance); by contrast, the wholesale remedies advocated in the Draft FFS do not. The extensive data collected by the CPG in the course of the RI/FS, including data ignored by the Region, support the CPG's CSM. Moreover, the CPG's CSM presents a system understanding in which human health risk is dominated by TCDD; hotspots of TCDD contamination have been identified up to RM 12 to 13,[3] while deeper inventory of contaminants is stable, natural recovery is continuing and background levels of contaminants of concern ("COCs") will limit the effectiveness of the bank-to-bank remedies proposed in the Draft FFS. The Alternative Remedy, described below, considers and is consistent with all these system understandings.

The Draft FFS is legally indefensible. As a threshold matter, Region 2 has proceeded in an arbitrary and capricious manner by soliciting comments on a document that has not been released for review. Region 2's failure to provide the CPG with the Draft FFS violates the public participation requirements of CERCLA, the Principles, and Sediment Guidance. Moreover, it defeats the stated purpose for the recent increase in the page limit for NRRB comments to "expand opportunities for stakeholder and PRP input to the NRRB." It is also inconsistent with Region 2's prior handling of NRRB review of other Region 2 sediment sites, such as the Gowanus Canal, where Region 2 publicly released the draft feasibility study prior to NRRB review. It is even inconsistent with the Region's approach to the 2007 draft FFS ("the 2007 Draft FFS"), which was made available to stakeholders, including the CPG, prior to CSTAG review. A remedy should not be selected without providing the public stakeholders an opportunity to fully vet such a document and provide a set of comprehensive comments *prior* to

[2] Over the course of the RI/FS process, the CPG has had ongoing discussions with the Region regarding its view of the CSM. The CPG is finalizing its written CSM for submittal in 2013.

[3] TCDD is the most significant COC and the main human health risk driver, yet the entities responsible for the TCDD contamination in the LPRSA, which accounts for the majority of the risk at the site, are no longer members of the CPG.

the NRRB review. As a result of this lack of access, these comments are necessarily based on the limited information that Region 2 has chosen to make available to the public, including the Stakeholder Summary. The CPG reserves its right to comment further when the complete Draft FFS is made available for review.

There is no legal basis, under the NCP or otherwise, for Region 2's performance of a separate remedial investigation or for its issuance of the Draft FFS. There is no basis for Region 2 to have conducted a separate remedial investigation of the lower eight miles when the CPG is performing an NCP-compliant remedial investigation of the entire 17-mile LPRSA under Region 2 oversight, including the lower eight miles covered by the Draft FFS.

Furthermore, the NCP outlines a detailed process to be followed for remedy selection. Consistent with that process, the CPG is performing an NCP-compliant remedial investigation of the entire 17-mile LPRSA, including the lower eight miles covered by the Draft FFS. However, the Draft FFS will propose a remedy for an area that is a portion of the larger area covered by the RI/FS, which is, in effect, a remedy within a remedy. In the RI/FS AOC, which is binding on both the CPG and Region 2, the Region agreed that the work to be performed by the CPG "shall provide all appropriate and necessary information to assess [LPRSA] conditions and evaluate alternatives to the extent necessary *to select a remedy* that will be consistent with CERCLA . . . ." for the entire 17-mile LPRSA (emphasis added). Without justification, Region 2 is attempting to circumvent that process for the lower eight miles of the River. There is simply no way of knowing whether the Draft FFS remedies will be consistent with the final remedy selected for the entire LPRSA pursuant to the RI/FS.

Moreover, the active remedial alternatives to be presented in the Draft FFS do not meet the criteria for an early action under the NCP. The NCP provides that "[s]ites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." 40 CFR § 300.430(a)(ii)(A). It further provides that "[o]perable units, including interim action operable units, should not be inconsistent with nor preclude implementation of the expected final remedy." 40 CFR § 300.430(a)(ii)(B). The Draft FFS active remedial alternatives, however, are not "early" actions and will not achieve significant risk reduction "quickly" or "expedite the completion of total site cleanup." Moreover, there is simply no way of knowing whether the active Draft FFS alternatives will be inconsistent with or preclude implementation of the rest of the final remedial action for the LPRSA, because the Draft FFS is itself the final action for the lower eight miles of the LPRSA.

The active Draft FFS remedial alternatives effectively eliminate any targeted or adaptive management approaches to remediation of the sediments. The Draft FFS considers a range of massive final remedies, while failing to address contamination from other continuing sources, such as the upper nine miles of the LPRSA and Newark Bay. It assumes that all sediments in the lower eight miles of the LPRSA are potential sources of contamination, when the RI/FS data (including 100 year-plus storm events) show that most of those sediments are stable. For that reason, the Alternative Remedy focuses on those surficial sediments with elevated concentrations which are not stable and which are therefore potential sources of risk and/or ongoing contamination. The approach Region 2 has taken is inconsistent with the Principles and Sediment Guidance, as well as EPA's approach at other sediment sites across the country, which typically has included evaluating and implementing sediment remedies sequentially from upstream to downstream, to prevent recontamination. The Draft FFS alternatives address the River from downstream to upstream and invite recontamination.

The Alternative Remedy. The data that have been collected during the remedial investigation, much of which does not appear to have been considered by Region 2 in developing the FFS, have provided the CPG with a detailed understanding of the LPRSA. Among the key conclusions supported by the data are:

- Human health risks are predominantly due to TCDD in fish tissue;
- Discrete locations where TCDD is found at concentrations significantly greater than background have been identified up to RM 12 – 13;
- Bathymetric surveys and radiodating of sediment cores have shown that even under extreme storm conditions, the vast majority of the buried sediment has remained stable; and
- Recovery is occurring. From 1995 – 2008, TCDD levels in both sediment and fish tissue declined by approximately 40%.

The Alternative Remedy currently under development is based on this system understanding. When all of the data collected during the remedial investigation is considered, the Alternative Remedy is the obvious choice for the LPRSA. The remedy is for the entire LPRSA, it targets the areas where TCDD is found at the highest concentrations in surface sediment, and incorporates the observed natural recovery into the analysis. Consistent with the Principles and Sediment Guidance, the Alternative Remedy incorporates adaptive management based on post-remediation monitoring.

The Alternative Remedy is being developed as part of the ongoing FS process, which, when completed, will be consistent with the NCP, follow the Principles and Sediment Guidance, and be superior to the Draft FFS alternatives. The Alternative Remedy is intended to be an interim measure which could be the subject of an interim Record of Decision, consistent with the Sediment Guidance, to be followed by monitored natural recovery until the remedy achieves protectiveness and ARAR compliance. Developed using multiple lines of evidence, the Alternative Remedy targets sediments that are inhibiting natural recovery and could be the final remedy for the LPRSA. However, monitoring will be performed to determine if additional measures are necessary to achieve compliance. Most importantly, the Alternative Remedy will maximize short-term risk reduction without decades of recontamination and disruption. It is based on the extensive data gathered in the RI/FS and is part of a comprehensive vision for the full 17 miles that will reduce risk, improve water and sediment quality, enhance habitat and ecological services and improve the value of the River for the community. Most importantly, the Alternative Remedy is consistent with the system understanding reflected in the CPG CSM, which is strongly supported by the data. By contrast, the Draft FFS is understood to have screened out a remedy along the lines of the Alternative Remedy, but *as a final* rather than an interim remedy, because it did not immediately achieve protectiveness, leaving the Draft FFS with no alternatives but massive combinations of dredging and capping. The Region should have (but failed to) consider whether the screened out remedy could have achieved protectiveness if additional measures were included, such as monitored natural recovery.

Conclusion. The NRRB should address the numerous defects in the Draft FFS, including its failure to address all available data and its incomplete and non-peer reviewed model, directly with Region 2 and refocus the approach. In particular, the NRRB should strongly support allowing the CPG to complete the RI/FS, which is on track to be completed in early 2015. The RI/FS will ultimately demonstrate that the Alternative Remedy will be superior to the Draft FFS remedies when evaluated against the NCP remedy selection criteria.

I. BACKGROUND

The history of the development of the Draft FFS suggests that it is essentially the same as an earlier version that was severely criticized by CSTAG in 2007. Although the CPG has not been provided with access to the Draft FFS, it would appear that the document still contains the same fundamental flaws and still ignores data collected in the RI/FS. The very fact that the Region has refused to provide the full Draft FFS to the CPG, and other stakeholders for review prior to its submission to CSTAG, highlights the Region's arbitrary and capricious actions to select a massive remedy through a process which is not supported by the NCP. Such an unprecedented lack of transparency cannot be supported under CERCLA's statutory and legal framework. Nor is it consistent with the Office of Management and Budget's December 8, 2009 Open Government Directive, directing agencies to take specific actions to implement the principles of transparency, participation, and collaboration, in order to promote government accountability and strengthen public participation in government decision-making.

Prior to 2007, Region 2 began to conduct the RI/FS for the LPRSA, which it then estimated would cost ten million dollars. In June, 2004, at the request of Region 2, the CPG and the Region entered into a cost recovery settlement under which the CPG provided the Region with over $13 million to fund the RI/FS. In 2007, the Region informed the CPG that its costs were so significantly under-estimated that it could not complete the study. The Region asked the CPG to take over and complete the remaining RI/FS tasks. Accordingly, on May 8, 2007, Region 2 and the CPG entered into the RI/FS AOC, covering the entire 17-mile LPRSA from the mouth of the River to Dundee Dam. The current estimated cost to complete the RI/FS is over $70 million.

At the same time Region 2 was negotiating the RI/FS AOC with the CPG, it was also preparing a draft focused feasibility study for an *early* action in the lower eight miles of the River ("2007 Draft FFS"). In the RI/FS AOC, Region 2 acknowledged that it was "evaluating interim remedial measures or interim or final early action alternatives" and that "implementation of any such action may result in the need to *resequence* certain RI/FS field investigation activities." (emphasis supplied) The Region specifically agreed that revised plans or schedules may be needed to reflect the "resequencing of RI/FS activities if impacted by the implementation of any interim action." However, EPA agreed that the Work to be performed under the RI/FS AOC "shall provide all appropriate and necessary information to assess [LPRSA] conditions and evaluate alternatives to the extent necessary *to select a remedy* that will be consistent with CERCLA . . . ." (emphasis supplied) Thus, while the CPG understood that interim or early actions were being considered — and the CPG agreed to resequence the RI/FS to accommodate such actions — the CPG did not agree that the FFS would supplant its Work to provide all necessary information for remedial selection in the LPRSA. The Draft FFS does just that because it nullifies the key goals and purpose of the CPG's performance of the RI/FS, to collect the data needed to select a remedy for the LPRSA.

In June, 2007, only one month after signing the RI/FS AOC, Region 2 released the 2007 Draft FFS for CSTAG review, proposing alternatives for a *final* remedy for the lower eight miles of the LPRSA, even though the CPG was then undertaking an RI/FS which included the entire LPRSA, including the lower eight miles. The proposal of alternatives in the 2007 Draft FFS for a final remedy for a portion of the LPRSA was in direct conflict with the RI/FS AOC. The CPG would never have agreed in May 2007 to complete the RI/FS of the 17-mile LPRSA had it known that Region 2 intended to select a final remedy only one month later for the lower eight miles of the LPRSA on a completely separate procedural track. Region 2's actions are arbitrary and capricious, do not comply with the NCP and have grossly undercut the 2007 RI/FS AOC and CERCLA decision-making process.

The 2007 Draft FFS was comprised of some 1,900 pages of reports and appendices which, unlike the current Draft FFS, were provided to the CPG for review and comment. Despite the massive amount of materials, the short timeframes allowed for review, and missing information, the CPG prepared and submitted comments to CSTAG relating to the 2007 Draft FFS. By letter dated August 16, 2007, the CPG commented that the 2007 Draft FFS was so technically and legally flawed that the CPG would not perform or pay for any of the alternatives considered in the document. The 2007 Draft FFS was also criticized by others, including CSTAG, non-governmental organizations and other government agencies. The NRRB should review and consider those critical comments, many of which appear not to have been addressed in the Draft FFS. In making its comments, CSTAG should also consider the fact that the Region has refused to provide the complete Draft FFS to the CPG, further hampering the CPG's ability to comprehensively review this document and provide more complete comments. Thus the Region has effectively precluded the CPG, the stakeholder, with the most complete understanding of the LPRSA from having the ability to comprehensively review and critique the Draft FFS.

To highlight the magnitude of the final remedial alternatives considered in the 2007 Draft FFS, the study proposed dredging of more sediment than the Hudson River and New Bedford Harbor Superfund projects *combined*. Such alternatives are inconsistent with the then Regional Administrator's November 2005 letter to the New Jersey Department of Environmental Protection ("NJDEP") rejecting NJDEP's prior request to remove 10 million cubic yards of sediment from the River. The Administrator stated that "[a]doption of such a dredging plan [], while the EPA/USACE/NJDOT study [including the current RI/FS] is ongoing – indeed before that study has even reached the stage of evaluating remedial action alternatives – would be inconsistent with our study," (i.e., the RI/FS). Furthermore, the Regional Administrator noted that the NJDEP dredging proposal "might [] wind up being inconsistent with the remedial action that is chosen by EPA *at the end of the study*." This reasoning applies with equal force today, yet Region 2 has arbitrarily reversed course in contravention of the NCP and its agreement under the RI/FS AOC, and proposes to select a final remedy for the lower eight miles of the LPRSA before the data it requires to be collected under the RI/FS is completed.

Following its review of a revised version of the 2007 Draft FFS in early 2008, CSTAG issued a series of critical comments and recommendations to Region 2 in an April 1, 2008 memorandum from S. Ells to A. Yeh. CSTAG's comments focused on the remedial alternatives for an early action and specifically addressed the Region's shortfalls in addressing the Principles. The Region responded to CSTAG's comments, indicating that the issues raised by CSTAG had been raised by other "internal and external reviewers" of the 2007 Draft FFS and that the Region had already embarked on a data collection effort to address many of the concerns. The Region responded by stating that its 2007-2008 sampling program and additional modeling and sediment stability work already addressed most of the concerns raised in CSTAG's 2008 recommendations. The Region provided no explanation for its failure to provide these critical data to CSTAG. Indeed, the CPG believes that the Region has still not adequately responded to CSTAG's recommendations. Column [F] of the chart attached hereto as Appendix 1 summarizes critical CSTAG recommendations that Region 2 has failed to address. The CPG believes that Region 2 is once again providing a document for NRRB review that is incomplete, premature and ignores a significant ongoing data collection effort (including data that has been collected over the past two years and was available for the Region to include in the Draft FFS).

The 2007 Draft FFS failed to propose a preferred alternative, leaving CSTAG to fill that void. The CPG understands that the Draft FFS also fails to select a preferred alternative. Region 2 should be required to propose a preferred alternative, and to make that proposed

selection public, so the CPG and others can meaningfully comment on the Draft FFS. The CPG reserves its right to comment further once the selection of a proposed alternative is made public.

II. THE DRAFT FFS IS SCIENTIFICALLY AND TECHNICALLY UNSOUND BASED UPON THE CURRENT UNDERSTANDING OF THE RIVER

A. Evaluation of Region 2's Stakeholder Summary of the Draft FFS

Region 2's remedial investigation for the Draft FFS does not meet the requirements of the NCP and is inconsistent with Region 2's own direction to the CPG to conduct the 17-mile LPRSA RI/FS.

There are a number of areas where the incomplete nature of the Draft FFS has led Region 2 to a series of incorrect findings and conclusions related to its CSM and the Draft FFS for RM 0-8. This appears to be the result of Region 2 excluding and/or otherwise failing to give appropriate consideration to the RI/FS data, as outlined in the following paragraphs. In addition, there are significant amounts of RI data that EPA has directed the CPG to collect in the lower eight miles, yet Region 2 has not given adequate consideration to these data.

1. Region 2's Draft FFS Ignores Significant Amounts of LPRSA RI/FS Data

Significant amounts of data appear to have been ignored and/or not to have been given adequate consideration by Region 2 in its remedial investigation for the Draft FFS. These data represent hundreds of sampling locations where sediment, tissues and water have been collected between 2008 and 2012, including data that will be collected in the lower eight miles in 2013. These data involve thousands of individual samples with hundreds of thousands of results that have cost the CPG tens of millions of dollars to collect – yet, they appear not to have been considered in Region 2's Draft FFS for the lower eight miles. This selective consideration of data is inappropriate because:

- Region 2's Draft FFS relies on an incomplete sub-set of data collected by various parties through 2010, but not beyond.
- Region 2 has directed the CPG and Tierra to collect large amounts of sediment, water column, bathymetric and biological data that have not been incorporated into Region 2's Draft FFS. These data, however, have been identified as required as well as characterized as crucial to complete the LPR/NB Model and the LPRSA RI/FS. By not using the data that Region 2 has deemed critical and has directed the CPG to collect, Region 2 has ignored CSTAG's 2008 recommendation to use all the information being collected as part of the RI/FS. The CSTAG comments are excerpted as follows:

  - *The Region should use the information being collected as part of the RI/FS for the 17-mile LPR to refine the CSM and verify the basis for the early actions proposed for the lower eight miles.*
  - *CSTAG believes that it may be necessary to collect more sediment samples in the lower eight miles to more adequately characterize the nature and extent of contamination.*
  - *After evaluating the briefing materials and other relevant information, the CSTAG concludes that additional sampling data are needed to support the main premise of the conceptual site model (CSM) that the entire lower eight miles is a "well mixed box".*

The CPG has identified six types of data that Region 2 has directed the CPG to collect as crucial data for the LPRSA RI/FS and the LPR/NB model, but has decided either to exclude or only partially utilize in the development of the Draft FFS, including the Draft FFS model and alternatives. Exclusion of these available data critically undermines any analysis and has already resulted in inaccurate conclusions about the condition of the LPRSA. The following summarizes these critical data:

- *Sediment Data* – The CPG has conducted three major sediment characterization collection efforts since 2008. These include the 2008 low resolution coring effort conducted throughout the entire LPRSA, the 2009 surface sediment grab sample program and the 2012 Supplemental Sampling Program:
  - The Draft FFS incorrectly claims to consider all sediment data collected through 2010; however, Region 2 indicates in the Stakeholder Summary figures (e.g., 4-3 etc,) that it did not use the 2009 Benthic Surface Grab (~100 locations) data.
  - Due to Region 2's exclusion of post-2010 data, it also did not use 2012 Supplemental Sampling Program surface data (~85 locations) in its preparation of the Draft FFS.
  - Furthermore, Region 2 is in the process of requiring the CPG to collect more sediment data throughout the entire 17 miles, including the lower eight miles, to fill RI data gaps identified by Region 2 and its Partner Agencies.

The NRRB should question how Region 2 can direct the CPG to collect additional data in the lower eight miles as part of the LPRSA RI/FS at the same time it concludes there is sufficient data to select a *final* remedy for the lower eight miles of the LPRSA. The NRRB should also urge the Region to consider these data and to evaluate the efficacy of a targeted, interim approach as an alternative to the massive Draft FFS remedies.

- *Surface Water Data* - Region 2 does not appear to have used the extensive Small Volume-Chemical Water Column Monitoring ("CWCM") data set collected by the CPG in 2011 and 2012, which includes sampling locations in the lower eight miles.
  - These data are considered critical by Region 2's modeling team
  - Region 2 has required the collection of 8 synoptic events in various flow and tidal conditions in the LPRSA and Newark Bay; five of which have been collected since August 2011.
  - Region 2 apparently does not intend to consider using data from the forthcoming High Volume-CWCM sampling that Region 2 has required the CPG to conduct. According to Region 2's directive comments and discussions with Region 2's modeling team (who developed the Draft FFS model); these data are considered by them to be crucial to complete the LPR/NB model as part of the LPRSA RI/FS. The RI/FS model relies on the same modeling framework used in Region 2's FFS model, so data critical to the RI/FS model are similarly critical for the Draft FFS model. These data will be used to:
    - Determine site-specific partitioning co-efficients for use in the chemical fate and transport model
    - Better characterize the boundary conditions of the model (e.g. above Dundee Dam, in Newark Bay)

The NRRB should question how such extensive and complex surface water sampling programs that Region 2's modeling team considers crucial for the model were not incorporated into the Region's model used to evaluate the proposed remedy that addresses, according to Region 2, 90% of the contaminated sediments in the entire LPRSA.

- *CSO/SWO Data* - Region 2 relies on older data sets, which will not include any information from the CSO Study to be conducted by Tierra under an AOC with Region 2. Phase 1 of the data collection is scheduled to begin later this year; this is another data set that will not be used by Region 2 in proposing a "final" remedy for RM 0-8. Those data will provide a better understanding of ongoing sources of urban pollution, including hazardous substances and the potential for recontamination.

The NRRB should question how information to be collected on sources, which are likely to impact the long-term effectiveness of any remedy, can be excluded from consideration while evaluating and selecting a final remedy for the lower eight miles. This is especially critical in light of the significant ongoing discharges of contaminants into the LPRSA and Newark Bay from a PVSC system that was rendered inoperable by Hurricane Sandy and is not expected to be fixed for a considerable time.

- *Bathymetry Data* - It cannot be determined from Region 2's Stakeholder Summary the extent to which the Region has relied on the five bathymetry surveys of the LPRSA (2007, 2008, 2010, 2011 and 2012) in developing the Draft FFS. The data gathered in these bathymetry studies confirm that the deeper inventory of contaminated sediments is stable and that infilling is continuing to occur.
    - Region 2 directed the CPG to conduct a bathymetry survey following Hurricane Irene in 2011 ("2011 Survey").[4]
    - Region 2 directed the CPG to conduct the most extensive bathymetry survey to date in order to assess the amount of infilling that occurred since Hurricane Irene and to establish a baseline bathymetric condition for future surveys. The survey was performed this fall ("2012 Survey").

Both the 2011 and 2012 Surveys were identified by Region 2's modeling team as providing crucial data for model development; however, the Region failed to incorporate these surveys in the Draft FFS and its related modeling. As a result, Region 2 has not adequately considered the results of the 2011 and 2012 Post-Irene Bathymetry Surveys in its selection of a remedy for the lower eight miles of the LPRSA and has not updated its CSM based on key available information.

- *Chemical Background/ Ecological Reference Data* - Region 2 does not rely upon the background and reference data that Region 2 has directed the CPG to collect above Dundee Dam. That collection effort is currently underway.
    - Instead, for chemical background, it relies on smaller, less comprehensive work conducted by its contractor and the work of its Technical Advisory Committee members and external peer reviewer (Bopp's upper Passaic River 2008 data) as the basis for background chemistry.
    - Region 2 does not rely on the "reference envelop" data that Region 2 has proposed and is likely to direct the CPG to collect above Dundee Dam, Jamaica

[4] Investigations are ongoing that will help the CPG understand potential impacts, if any, from Hurricane Sandy.

Bay, Long Island and the Mullica River in Southern New Jersey to determine the impact on the biota by the site.

- It is not clear that Region 2 is conducting any comparison of site impacts to reference conditions in its characterization of ecological risk for the lower eight miles of the River.

Selection of a final remedy for the lower eight miles without incorporating key data, as identified above, has led to an incomplete and in some instances, incorrect understanding of the LPRSA site.

a. Region 2 Incorrectly Contends that the Highest Concentrations in Surface Sediments are Located in the Lower eight miles

Region 2 incorrectly concludes that "the highest concentrations of COPCs and COPECs tend to be found in areas that are predominantly comprised of silts, which, for the Lower Passaic River, are the lower eight miles, the FFS Study Area". This conclusion is technically unsound and is based on a limited and older data set that does not include the more recent data (described in the foregoing section) that Region 2 has directed the CPG to collect.

As shown in Figure 1 below, analyzing the fully integrated LPRSA RI data, including the 2009 and 2012 sediment sampling results, reveals that the highest surface concentrations are located between RM 7-12, with peak surface concentrations at RM 7.3 (34,100 ppt of TCDD) and RM 11.2 (23,200 ppt), as well as within the 5.5 acre footprint of surface sediments that Region 2 determined needed to be removed as part of the Removal Action at RM 10.9. Accordingly, the RI data supports the superiority of a targeted approach, focused on the limited areas with the highest concentrations within the entire LPRSA.

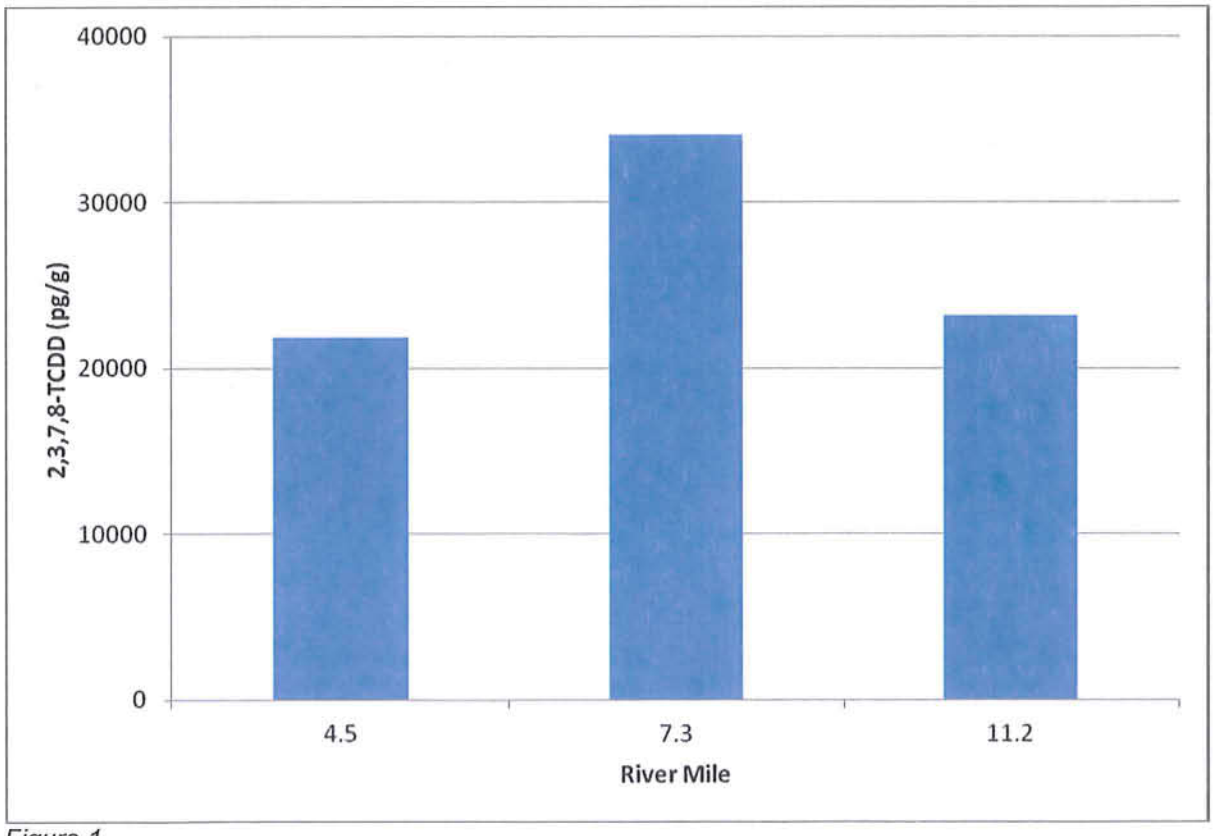


Figure 1

2. Region 2 Has Ignored Data and Its Own Modeling Results that Show Natural Recovery is Occurring

Region 2 incorrectly contends that natural recovery has ceased in the Lower Passaic River. In its Stakeholder Summary, Region 2 states:

> *. . . the river is not steadily filling with "cleaner" sediments from elsewhere, but rather that legacy sediments are uncovered and resuspended periodically by scouring during high flow events, so that contaminant concentrations in the surface sediments have remained approximately the same in recent years. Sampling in 1995 through 2010 confirms that FFS Study Area surface sediment median contaminant concentrations have remained almost unchanged over the 15- year period …*

However, in reaching this invalid conclusion, Region 2 has ignored the 40 percent decrease in *mean* (as opposed to median) surface sediment contaminant concentrations from 1995 to 2008 and the similar decrease in *mean* fish and crab tissue contaminant concentrations over the same period, as shown in the following Table 1.

Sediment Concentration		**Preliminary EPCs for Fish and Crab Tissues**							
2,3,7,8-TCDD (ng/kg)	Surficial (0-0.5'), RM 0-7	TCDD - TEQ (pg/g)	American Eel	White Perch	Mixed Perch and Eel	Channel and White Catfish (a)	Blue Crab Muscle & Hepatopancreas	Blue Crab Muscle	Blue Crab Hepatopancreas
CPG 2008/2009 Data	440	CPG 2009 Data	17	52	31	64	60	10	208
Historical	827	Historical	29	90	64	175	87	18	338
% Reduction	47	% Reduction	40	42	51	64	32	42	39

Notes:

Historical sediment data is from Tierra (1995)
EPC = Exposure point concentration, as represented by upper confidence limit (UCL) calculated using ProUCL.
Historical EPCs for fish calculated using available fillet data sets (perch n=6; eel n=7; bullhead n=6).
Historical EPCs for crab calculated using available data sets (crab muscle & hepatopancreas n=20-28; crab muscle n=18-35; crab hepatopancreas n=15-31).
[Historical Tissue data is a compilation of the following datasets: Tierra 1995 (Fall), Tierra ESP 1999 (Fall), Tierra ESP -2000 (Spring), NOAA CARP 1999 (Fall), and NJDEP 2004-2005 (Winter).]

Table 1

Rather than using the mean concentrations for comparison, Region 2's Stakeholder Summary inappropriately relies on *median* concentrations for comparison, leading to the incorrect conclusion that no ongoing recovery is occurring. Reliance on a comparison of *median* concentrations is inappropriate and misleading for the following reasons:

- The areas with the most potential to recover are those with the highest contaminant concentrations because newly deposited particles have much lower concentrations. The *median* concentration is not an appropriate measure for this recovery.

- Recovery of the lower concentrations areas can be inhibited by the influence of the higher concentration areas, not because recovery mechanisms do not exist. This causes the *median* concentration to respond more slowly than the *mean* concentration.

Moreover, the *mean* concentration is the appropriate statistic for understanding changes in risk as the *mean* is the best estimate of exposure to the contaminants, assuming equal exposure throughout the river. This *mean* is the basis of EPA's Exposure Point Concentration assessment used for risk assessment, which relies on the distribution of data and not a single point, such as the *median*. Consider the following simple analogy. Five glasses of water are lined up in a row. The first four glasses of water contain no contaminants but the fifth glass contains contaminant X at concentration Y. The *median* concentration of contaminant X is zero, but the *mean* concentration is Y divided by 5. If a receptor samples each glass, he would receive a dose characterized by the *mean* concentration. By contrast, the *median* concentration of zero provides no information on dose. Thus, the median concentrations cannot be used to conclude that natural recovery is not occurring.

While contending that there has been no recovery over the last 15 years, Region 2 presented a contaminant fate and transport model output during the September 2012 Community Advisory Group meeting that shows significant natural recovery over this period. The model output starts in 1995 with a mean surface sediment TCDD concentration of about 600 ppt. Up until 2008, all the empirical data and the Region 2 modeling results are aligned and show a consistent decline in average surface concentrations of TCDD. Although the Region 2 model indicates a quick reversal of that process after 2008, there is no scientific reason to believe that such a reversal is actually occurring and Region 2 has offered no such explanation whatsoever. Rather, the reversal is likely an error within Region 2's model, which has not been able to replicate existing conditions and has never been peer reviewed. The model result is likely an artifact of misrepresentations of sediment and contaminant transport as discussed in Section II(c) of these comments.

The data plainly show that concentrations of contaminants have been dropping, including for TCDD, which is the risk driver for the River. Region 2's contention that recovery is not occurring or has suddenly stopped has no factual basis. Instead, Region 2 relies on a model that is flawed as discussed in Section II(C) of these comments.

3. Region 2 Incorrectly Contends That the EMBM Supports the Region's Numerical Model

Region 2 has incorrectly claimed that its new numerical model agrees with the results of its Empirical Mass Balance Model (EMBM), particularly with regard to the conclusion that "resuspension of FFS Area sediments from tidal activity and scouring during high flow events is the primary ongoing source of COPCs and COPECs to the water column and surface sediments of the FFS Study Area . . ." (page 8 of the Stakeholder Summary). Region 2 apparently argues that the EMBM confirms the accuracy of the numerical model. However, the EMBM cannot support the numerical model.

The EMBM failed to examine resuspension from tidal activity. It looked at resuspension of buried sediments and came up with two unsupported theories. One theory assumed that legacy contaminated sediments deposited over the last half century are being resuspended on a regular basis. Under this theory LPRSA sediment resuspension is predicted to contribute about 12% of the solids load to LPRSA surface sediments. That is, 12% of material currently being deposited in the LPR SA is simply resuspended material being redeposited. The alternate EMBM theory assumed that material deposited during the 1990s is being resuspended, which implicitly assumes that there is a sediment mixed layer about 2.5 ft. thick interacting with the

water column. In this case, the contribution of sediment resuspension to the solids balance is about 97%. These theoretical explanations are so disparate as to be of no value. More importantly, they are unsupported by the data that the CPG has collected.

4. Region 2 Incorrectly Claims that Resuspension of Legacy Sediments is the Only Significant Source for "Most Risk Drivers"

EPA Region 2 incorrectly contends that:

> *". . . the Upper Passaic River, Newark Bay, tributaries, combined sewer overflows (CSOs) and storm water outfalls (SWOs), are not significant contributors of contamination (for most risk drivers) to the FFS Study Area, when compared to the resuspension of legacy sediments in the main stem of the FFS Study Area."*

This is an overstatement and reflects an incorrect understanding of the LPRSA system. External sources are not significant for TCDD; however, the opposite is true for other COPCs. This can be seen in the comparison of the average concentrations in the lower 12 miles of the LPRSA to the Upper Passaic River and comparison of the lower 12 miles of the LPRSA to Upper Newark Bay (Figure 2). Since the Upper Passaic River and Newark Bay are sources of sediment to the LPR, the fact that these areas have COPC concentrations about equal to (or greater than) those in the LPRSA means they must be controlling surface sediment concentrations in the LPRSA. This is supported by the latest data which show that, with the exception of TCDD, concentrations of all other COPCs in surface sediment are approaching regional background concentrations. Downplaying the significance of other potential sources will impede the ability to develop and evaluate remedial alternatives and to select a remedy.

Additionally, the assertion that legacy sediments are being resuspended is inconsistent with the Region 2 numerical model, which does not predict deep erosion and associated resuspension of deeply buried sediments with high levels of COPCs, even under rare high flow events.

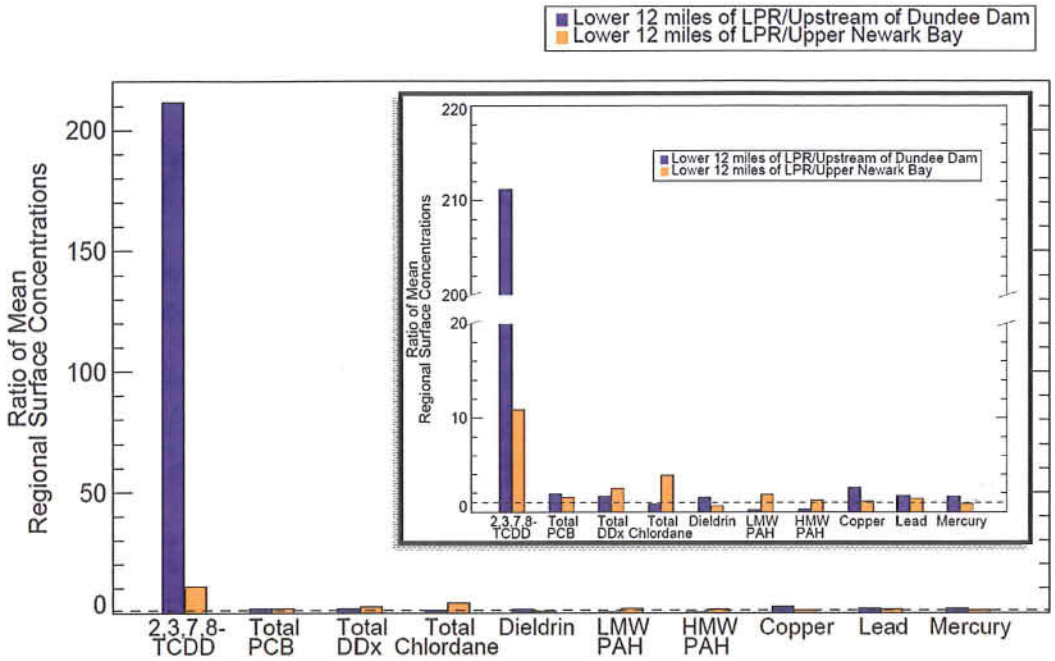


Figure 2: Note - Concentration in Upper Newark Bay increased by 49% based on Lower observed TOC in Upper Newark Bay.

5. Region 2 Overlooks the Limitations of the Environmental Dredging Pilot Study

Region 2 improperly utilized the results of the Environmental Dredging Pilot Study ("EDPS") to develop an estimated dredging production rate for each of the two primary mechanical dredges of approximately 2,000 cubic yards per 24 hour day. This estimated production rate, however, is an overestimate calculated without incorporating information on the notable limitations of the EDPS. The EDPS was conducted in Harrison Reach in mid channel and so avoided the impacts of any obstructions such as bridges or those known to occur near-shore. The dredging only occurred to a depth of 3 feet and purposely only removed lightly contaminated material. Thus, the EDPS avoided most of the challenging aspects of dredging in the Lower Passaic River, resulting in an unrealistically high estimate of the potential dredging production rate.

The Region confirmed during a March 2009 presentation to the LPR Project Delivery Team, that the EDPS was not intended to provide information for use in understanding or evaluating the following:

- other remedial alternatives such as capping
- clean-up passes and residuals,
- cost implications for a full-scale dredging operation, and
- quality of life issues

Despite its statements to the contrary, Region 2 has utilized the EDPS to extrapolate and support the selection of two significant dredging remedies, ranging from 4.3 to 9.6 million cubic yards of dredged materials. The EDPS was never intended by the Region to be used for such purposes. Its use to predict dredging production rates (and hence project duration and costs) is unreliable and inappropriate. To the CPG's knowledge, no environmental dredging in

an urban setting, with bridges, debris and other obstructions, has ever achieved the production rates forecast by the EDPS. In that context, CSTAG should urge the Region to consider the information currently available and to be generated (e.g. production rates, transportation routes, potential traffic issues, air monitoring etc.) from the work at RM 10.9.

6. Region 2's Biased Adjustment of LRC PCDD/PCDF Data May Inflate Risk and Affect Recovery Rates

Region 2 purports to have identified a low bias in the 2008 LRC PCDD/PCDF data and subsequently directed the CPG to multiply all 2,3,7,8 - TCDD results by an adjustment of 1.89. The CPG complied with Region 2's directive although there was ample evidence that this adjustment would ultimately result in biasing the data high.

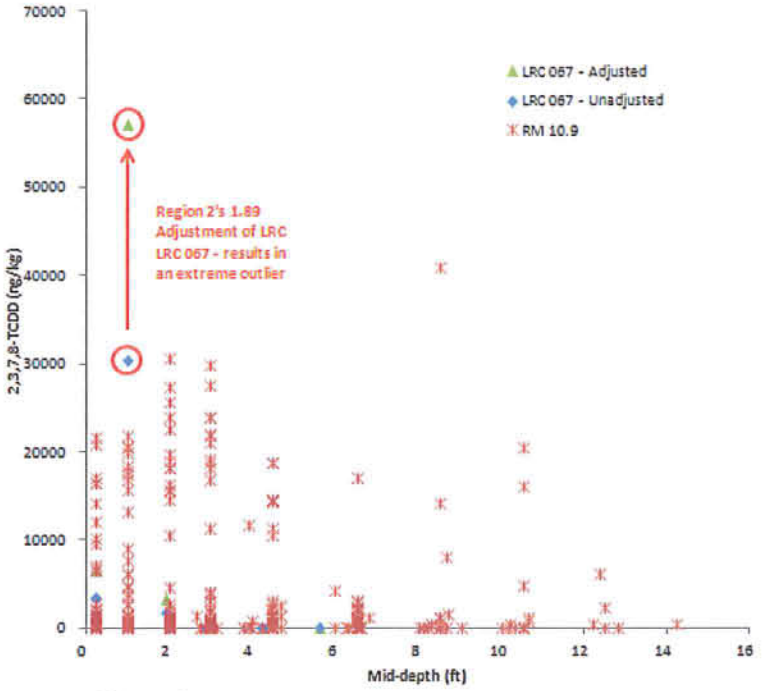


Figure 3

The RM 10.9 Characterization data collected in 2011-2012 (data which the Region has failed to address in the Draft FFS), confirms that the Region 2 adjustment factor produces a high bias to the 2008 LRC data. Notably, the LRC 067 PCDD/PCDF results were one of the lines of evidence that Region 2 used in directing additional work at RM 10.9. The second core segment of LRC-067 included a result of ~30,000 ppt of TCDD. Figure 3 above shows the entire TCDD data set from the RM 10.9 sediment deposit as well as the results from the second core segment from LRC 067 (the later both unadjusted and adjusted). When the TCDD results for LRC 076 are adjusted; the results for the second core segment are nearly doubled creating an obvious outlier as compared to the remainder of RM 10.9 data. Region 2's adjustment of the data set clearly created high bias in the data set and specifically an outlier among the RM 10.9 data by using its adjustment factor on the LRC PCDD/PCDF data. This is clear evidence that Region 2 adjusting the LRC PCDD/PCDF data was incorrect and results in an overestimate of PCDD/PCDF that is likely to significantly affect estimates of recovery rates and risk in the River including RM 0-8.

B. Region 2's Implementation, Cost and Duration Estimates are Unrealistic and Ignore the Constraints of Dredging and Capping Large Areas of the Lower Passaic River

1. Overview

The CPG has conducted an FS-level evaluation[5] of the two dredging alternatives that the CPG understands are to appear in the Draft FFS: Deep Dredging (removal of 9.6 million CY); and Dredging and Capping (removal of 4.3 million CY). The purpose of the CPG's review was to evaluate the validity of Region 2's Draft FFS assumptions by (1) estimating the duration for each alternative using assumptions that take into account physical, ecological, and logistical constraints that exist in the LPRSA and not adequately considered in the 2007 FFS analysis of alternatives; (2) evaluating the impact of these constraints on duration and implementation; and (3) estimating the costs of each dredging alternative using off-site disposal options.

Based on that review, it is clear that Region 2 has improperly relied upon overly optimistic and unsupportable assumptions for each of the critical factors that affect duration. Specifically, the Region relies on the following *unrealistic* assumptions:

- The EDPS results are representative of dredging productivity that can be achieved in all reaches of the lower eight miles of the River (i.e., a "one-size-fits-all" approach);
- Offsite disposal facilities and capacity will be available to receive dredged volumes under either dredging alternative;
- Bridge and navigation safety constraints do not impact the number and size of dredges and barges that can be used in the different reaches of the River; and
- Migratory fish window restrictions will be waived or modified.

As shown in Table 2, the CPG's more realistic analysis of the same factors results in duration times that are two to three times longer than Region 2's theoretical and unsupported estimates.

TABLE 2
Comparison of Region 2 and CPG Duration Estimates

Remedial Alternative	Region 2	CPG	
		No Fish Window Restriction	Fish Window Restriction
Alt #2—Deep Dredging (9.6 million CY)	11 years	18 years	30 years
Alt #3—Capping with Dredging (4.3 million CY)	6 years	12 years	21 years

None of the changes in duration or volume presented in the Stakeholder Summary appear to remedy the fundamental and fatal flaws identified in the CPG's review of the 2007 Draft FFS. Instead, those flaws appear to be perpetuated in the Region's analysis of the Draft FFS alternatives.

[5] As noted previously, Region 2 has not provided the CPG with the Draft FFS or identified the alternative that it intends to propose in the Draft FFS. However, Region 2 presented an updated summary of its two preferred alternatives to the LPRSA CAG on September 18, 2012 and in the Stakeholder Summary. Region 2 has modified the volumes and duration times from those presented in both the 2007 Draft FFS and the February 8, 2011 presentation to the CAG. Therefore, out of necessity, the CPG's analysis presented in this document evaluates the only detailed assumptions and information publicly available – those contained in the 2007 Draft FFS and the updated estimates of duration and volume presented to the CAG in September and in the Stakeholder Summary.

2. Summary of FFS Alternatives

Two alternatives are expected to be carried forward from the 2007 Draft FFS by Region 2 in its Draft FFS:

- Alternative 2 – Deep Dredging (f/k/a Alternative 1 — Removal of All Fine-Grained Sediment from Area of Focus) - the 2007 Draft FFS estimated a total sediment volume of 10.7 MM[6] CY and 8.9 years to complete the work. In its presentation to the CAG, Region 2 reduced the volume of this alternative to 9.6 MM CY while increasing the estimated duration to 11 years.
- Alternative 3 – Capping with Dredging (f/k/a Alternative 4 — Engineered Capping of Area of Focus Following Construction of Navigation Channel to Accommodate Current Usage) - The 2007 Draft FFS estimated a total sediment volume of 4.4 MM CY[7] and 5.5 years to complete the work. In its presentation to the CAG, Region 2 decreased the volume of this alternative to 4.3 MM CY and increased the duration to approximately 6 years.

Three disposal options are identified for both alternatives:

- Offsite disposal (landfill)
- Confined Aquatic Disposal (CAD) in Newark Bay
- Local decontamination (i.e., thermal treatment, sediment washing) and beneficial reuse.

[6] The volume is based on a compilation of information from the 2007 draft FFS Figures 4-1 and 4-4. The volume of sediment to be removed by river section (in river miles [RMs]) breakdowns as follows:
- RM 0.0 to 2.6 = 5.8 MM CY
- RM 2.6 to 4.6 = 2.1 MMCY
- RM 4.6 to 8.0 = 1.7 MM CY

[7] A breakdown of the volume by river section is as follows:
- RM 0.0 to 2.6 = 2.3 MMCY
- RM 2.6 to 4.6 = 903,000 CY
- RM 4.6 to 8.0 = 1.1 MMCY

3. Contrasting Approaches to Operation and Duration Assumptions

The lower eight miles of the Passaic River are far from uniform and present many challenges which the Region has ignored in its overly simplistic and unrealistic estimate; aging urban infrastructure in many sections presents challenges for on-water operations. The aerial photo of RM 4.7 to 6.1 illustrates the density of this infrastructure, particularly the numerous bridges with low vertical clearances. The tidal nature of the River exacerbates the differences between specific reaches of the River. Yet, despite these varying conditions and challenges, Region 2 has used an overly simplified, one-size-fits-all approach for its dredging operation and duration assumptions. As more fully discussed below, the Region optimistically extrapolates the results of a very limited EDPS to the entire eight miles. At the same time, it ignores constraints and restrictions that undermine the validity of its critical assumptions.

By contrast, the CPG's analysis uses a more detailed reach- and condition-specific approach to those project elements that have the greatest potential impact on project duration. Accordingly, the CPG's estimates of duration better reflect the realities of project execution.

Aerial View RM 4.7 to RM 6.1

Region 2 uses an overly-simplified, one-size-fits-all approach for the 8 mile FFS assumptions.

The CPG's analysis uses a more detailed condition- and reach-specific approach.

4. Reliance on the EDPS

In the 2007 Draft FFS, Region 2 assumed an average dredge production rate of 2,000 CY for a 24-hour day based on the EDPS. This reliance on the EDPS is reaffirmed in the Stakeholder Summary wherein the Region states the production rate is "conservatively estimated to be 2,000 CY per 24-hour day." An examination of the nature of the EDPS and how its results were evaluated reveals, however, that applying the 2,000 cubic yards per day assumption to all reaches of the lower eight miles of the LPRSA is neither conservative nor realistic.

The EDPS was limited in all respects – duration, volume, location, depth, and type of dredging. The EDPS was conducted over six partial days. One dredge and two barges removed 4,200 cubic yards through first-pass production dredging for bulk sediment removal only in the vicinity of RM 3.0 (downstream of the low clearance bridges). Those aspects alone make it unrepresentative of removing 4.3 to 9.6 million cubic yards over eight miles of river with varying conditions and constraints. Simply multiplying the number of dredges and barges and the number of hours per day is a seriously inadequate extrapolation to a mega-scale project. Even without considering the bridge and navigational constraints discussed below, Region 2's extrapolation does not take into account the need for thin-cut dredging, clean-up pass dredging,

debris segregation and removal, avoidance of utility crossings, and unstable bulkheads and other structures.

Beyond just the limited nature of the EDPS, there are also serious issues about how the Study results were evaluated. In extensive comments submitted to the U.S. Army Corps of Engineers ("ACOE") on December 7, 2007, the CPG documented that the approach to calculate production rates did not follow standard industry procedures (ACOE EM 1110-2-1302, Appendix 6 - Preparation of Dredge Cost Estimates). For example, in the working time analysis, delays for repairs, weather and mobilization/demobilization were not considered. The operational parameters that were considered (i.e., cycle time, percent excess water, operational uptime, etc.) are more what the ACOE considers typical for navigational dredging in the New York area (e.g., New York Harbor), not environmental dredging in a constrained and highly urbanized river.

5. Bridge and Navigation Safety Constraints

During the EDPS, the Conrail Bridge at RM 2.3 was a major obstruction to reaching the intended reach for the Pilot. The dredge barge was unable to clear the bridge even during low tide and a delay in mobilizing equipment was encountered when repairs were necessary before the bridge could be opened. Despite this experience, the Draft FFS does not consider the constraints presented by vertical and horizontal clearances of the numerous bridges on the River, particularly upriver of RM 4.6, where numerous such constraints exist.

The EDPS utilized an 8 CY environmental dredge bucket and a 3,000 ton barge (260 ft long by 52 ft wide). This equipment cannot be used upriver of RM 4.37 (location of Jackson Street Bridge). Between RM 4.37 and RM 6.07 there are five bridges that have vertical clearances of less than 13 feet at low tide (see Table 3, attached hereto as Appendix 2). The required vertical clearance for an empty 3,000 ton barge as well as smaller 1,500 ton barges (150 ft long by 38 ft wide) is a minimum of approximately 13 feet which make these barges impractical for use on the LPRSA above RM 4.37, without bridge openings. Opening and closing these very old bridges poses a significant risk to the flow of high volumes of highway and rail traffic in the Newark area. As recently as October 3, 2012, the Bridge Street bridge would not close during an evening rush hour, causing a massive traffic jam. Thus given the traffic constraints in this high traffic area and the age and condition of the bridges highlights that opening and closing these bridges several times per day over many years of dredging is not a realistic option. Rather, the more likely scenario is that much smaller barges and equipment will be required to be used above RM 4.37. This will equate to a slower rate of removal than the one size fits all assumptions that the Region improperly relied on in the Draft FFS.

Channel width and horizontal bridge clearances will also constrain the size of barges that can safely be used as determined by ACOE design standards (EM 1110-2-1613). Based on these design standards, the navigational channel width is recommended to be three times the width of a marine vessel for the safe passage of one-way traffic and five times the width of a vessel for safe passage of two-way traffic. For example, if the recommended criteria were used, the largest vessel for one-way traffic that could safely pass between the Clay Street Bridge (RM 5.83, 75 ft horizontal clearance) and the Jackson Street Bridge (RM 4.37, 72 ft horizontal clearance) would have a maximum width of approximately 25 feet. For the safe passage of two-way traffic in the authorized navigational channel above RM 6.3 (200 feet) the maximum width of the vessels would be 40 feet.

Another physical constraint that will limit barge traffic is the requirement of turning basins having a diameter of at least 1.2 times, and preferably 1.5 times the length of the vessel. Based on the ACOE design standard, the maximum length of a vessel should not exceed 200 feet

downriver of RM 6.3 where the authorized channel width is 300 feet or 130 feet upstream of RM 6.3 where the authorized channel width is 200 feet.

Consequently, in addition to inaccessibility due to low bridges and old infrastructure, both width and turning basin specifications will limit the safe use of the proposed 3,000 ton barge size vessels above RM 4.37. As the dredging operations move up river, the size of the barges must be reduced to accommodate the physical constraints of the existing infrastructure (e.g., maximum vertical clearance) resulting in more barges being required to support the daily dredge rate. The maximum vertical clearance is realized at low tide and the allowable time to safely clear the constraining bridges between RM 4.37 and RM 6.07 is limited to about 2 hours (low tide +/- 1 hour). Therefore, assuming a reasonable tow speed of 1 mph, one-way barge separation of 10 minutes and 2-way vessel traffic coordination such that full and empty barges pass on the River where horizontal clearance is ~200 feet (RM 5.61), the logistics of clearing this 1.32 mile stretch of river in 2 hours is achievable for 6 barges (3 empty and 3 full). However, this passage cannot be safely accomplished when the number of barges increases. Based on the above restrictions on barge size and cycle time, it is clear that Region 2's assumptions of daily dredge rates of 6,000 CY (Alternative 1) and 4,000 CY (Alternative 4) are clearly not achievable above RM 4.6.

6. Migratory Fish Window Restrictions

The Stakeholder Summary states:

"Dredging was assumed to occur for 40 weeks per year to account for equipment maintenance, weather and a period during which work may halt to allow for fish migration (known as a fish window)."

"The Passaic River is a migratory pathway ... in-water work should not occur between March 1 and June 30."

—Conclusions by the NOAA's NMFS for the Lister Avenue three month removal in 2012

An annual 40 week dredging period only accounts for normal down time due to winter conditions in the Northeast. The Draft FFS, therefore, improperly assumes that the 17-week fish migration window restriction (March 1 to June 30) will be waived or shortened significantly by a new fish migration study.

That assumption is contrary to the position of EPA's partner agency, NOAA, and its National Marine Fisheries Service (NMFS), which made recommendations for the much smaller, 3-month-long, Lister Avenue non-time-critical removal action that was recently performed by Tierra on the LPRSA. NMFS's position for that project contradicts the Region's unsupported assumptions in the Draft FFS:

"The Passaic River is a migratory pathway, nursery, and forage area for anadromous fish in-water work should not occur between March 1 and June 30 of any year to minimize impacts to migrating anadromous fish."

As a result, Tierra was required to construct physical facilities that would minimize any impacts to migratory fish. Constructing similar physical facilities would be impracticable for the millions of cubic yards and many years of dredging envisioned by Region 2 for eight miles of the LPRSA.

The premise that NOAA's fish window restriction will be waived completely or substantially for the 6 - 11 years estimated by Region 2 or the much longer durations estimated by CPG is unjustified and unrealistic. This unfounded assumption highlights the arbitrary and capricious nature of the Draft FFS.

7. Resuspension Considerations

The Draft FFS states that the Alternative 2 dredging plan is to proceed from upstream to downstream and post-dredge backfill in two lifts to alleviate post-dredge residuals – the first soon after dredging and the second after all dredging has been completed. This sequencing will allow residuals to contaminate the interface between the two lifts over the many years it will take to complete dredging. The Stakeholder Summary also indicates that the Alternative 3 dredge plan is to initiate dredging in RM 0 to 2.2, followed by RM 8.3 to 2.2, and then finish dredging with the Kearny Point mudflats. This sequencing will allow residuals generated by the upstream dredging to contaminate the cap in RM 0 to 2.2. Both of these approaches are contrary to commonly approved and accepted sediment removal practice.

8. Sediment Treatment and Disposal Issues

All three disposal options proposed in the Draft FFS present significant issues of implementability and impact on duration.

1. Newark Bay CAD - The permitting of CAD cells has historically been a lengthy and often unsuccessful process, particularly for sediments from environmental dredging. Moreover, EPA's

Partner Agencies (e.g., NJDEP, USFWS) and community stakeholders (CAG, NGOs etc.) have publicly objected to the placement of a CAD in Newark Bay. As a consequence, in addition to much longer project durations than estimated by Region 2, commencement of the entire project could be delayed by several years while gaining consensus, approval, permitting, siting and construction of a Newark Bay CAD, even if there is no litigation challenging the siting of a CAD. In reality, such litigation is highly likely.

2. Off-site Disposal (Landfill) - There are currently no treatment facilities in the NY/NJ Harbor that are capable of dewatering or stabilizing 4.3 to 9.6 MM CY of contaminated sediment prior to off-site disposal in a landfill. Moreover, Region 2 has not demonstrated that the landfill capacity will be available over the 11-year estimated duration of the project or as much as 30 years that the project is estimated to require. There would also likely to be significant issues with siting a sufficiently large facility in the NY/NJ Harbor near rail facilities. The shortage of capacity is likely to be exacerbated by EPA's recent lowering of the threshold level for TCDD.

3. Beneficial Treatment Technologies - The CPG does not agree that local treatment and beneficial reuse (e.g., thermal treatment and sediment washing) are viable disposal alternatives for the volumes of sediment being considered by Region 2. It has never been demonstrated that these treatment processes will ever be available to successfully treat the volumes of LPRSA sediments at the sustained production rates required to meet Region 2's duration estimates. In fact, recent sediment washing tests conducted by the CPG at the request of Region 2 failed to show that they were effective in treating the contaminants of concern at RM 10.9. Also, some public stakeholders have expressed their opposition to the siting of a thermal treatment system in the Newark Bay area.

9. Region 2's Draft FFS Cost Estimates for the Eight–Mile Study Area are Vague, Incomplete and Cannot be Vetted

Region 2 is proposing the most costly sediment remediation ever advocated by an EPA Region. Notwithstanding the *billions* of dollars at issue, the Region has not provided the CPG and other stakeholders with any information on how it calculated costs for two of its three disposal scenarios. The 2007 Draft FFS only contained backup information on the CAD option. The Stakeholder Summary of the Draft FFS, however, only provides total cost estimates for off-site disposal, and local treatment and beneficial use. The ambiguous narrative accompanying these recent estimates causes even more uncertainty.

As in the case of duration, the CPG has developed its own FS- level cost estimates using realistic assumptions specific to the LPRSA. As previously stated, local treatment and beneficial reuse are not viable disposal scenarios. Likewise, it must be recognized that the siting and permitting of a CAD has historically been a lengthy and often unsuccessful process. If Region 2 is relying on the CAD located in Newark Bay to keep down the total costs of its preferred remedial alternatives, it is essentially making a political bet. Without whole-hearted support from all LPRSA stakeholders, the construction of a new CAD in Newark Bay with a capacity of approximately 10 million CY of sediment would be virtually impossible.

Without the CAD and local treatment and beneficial reuse options, Region 2 is left with only the off-site disposal scenario. Region 2's cost estimates for the Draft FFS preferred active remedial alternatives assuming off-site disposal range from $1.9 billion to $3.4 billion. However, using more realistic assumptions, the CPG estimates that these costs actually range from $2.0 billion to $5.0 billion. *Thus, Region 2 may be underestimating off-site disposal cost by as much as $1.6 billion – nearly half of Region 2's estimated cost for the entire Deep Dredging alternative*.

Region 2's erroneous or unrealistic assumptions can have very large cost implications. The following are a few examples:

- Volume of sediment – Variations in volume will be the result of what is actually dredged, as well as what sediments are dewatered and/or stabilized.
- Mode of transport – Region 2 appears to assume rail transport. *Region 2's Alternative #2 (9.6 million CY) will require over 180,000 rail car loads.* If rail is not available, more costly and disruptive truck transport would be required, causing thousands, if not tens of thousands of truck trips through neighboring communities.
- Incineration v. landfill – Region 2's Stakeholder Summary ambiguously states that disposal will be to "incinerators and/or landfills in the U.S. or Canada." What ratio is Region 2 assuming between the two disposal methods? Incineration costs as much as four times landfill disposal, on a unit cost basis. Moreover, it is doubtful that incinerator and landfill capacity exists, or will exist, to accommodate the huge volumes contemplated by the project.
- Tipping fees – A range of market rates exists. What rate has Region 2 picked for its current cost estimates? Given the estimated project duration (11 years, as assumed by Region 2, or even the 20-30 years estimated by the CPG), and potentially shrinking future disposal capacity, it is not realistic to assume one rate for the duration of the project, even with adjustments for inflation.

Considering the lack of information available with respect to the cost estimates, the potential for a $5 billion remedy and the unrealistic assumptions already identified in Region 2's duration estimates, Region 2 should provide appropriate detail supporting its cost estimates and demonstrate that it has thoroughly evaluated the underlying assumptions. NRRB should thoroughly evaluate Region 2's cost estimates as part of its review of the Draft FFS.

10. A Reach-Specific Approach to Evaluating Duration of the Proposed Alternatives

In contrast to Region 2, the CPG evaluated conditions specific to each LPRSA reach, to identify varying bridge and channel dimensions that would constrain the size and quantity of equipment commensurate with safe navigation along the LPRSA. In its analysis, the CPG also selected appropriate equipment to address mudflats or areas needing thin-cut dredging prior to capping. As summarized in Tables 4 and 5 attached hereto as Appendix 3, this reach-specific approach results in varying equipment and, thus, varying dredge production rates in the different LPRSA reaches.

The consequences of this analysis, which uses more realistic reach-specific information, are duration times that are two to three times longer than those estimated in the Draft FFS, as long as 30 years for Alternative 2 and 21 years for Alternative 3. These longer periods do not account for delays because of lack of treatment/disposal facilities or reductions in dredging hours/day because of noise or other restrictions that may be demanded by stakeholders.

C. REGION 2'S FFS MODEL IS FLAWED AND INCOMPLETE

1. Introduction

The following section summarizes the CPG's concerns about Region 2's Draft FFS Contaminant Fate and Transport (CFT) Model ("FFS Model"), and its use of that model as a tool for remedy decisions. CPG's comments are laid out in detail, but are summarized as follows:

- Region 2's FFS Model does not meet the requirements of a valid and useful contaminant fate and transport model
- Region 2's FFS Model does not produce credible predictions of the protectiveness, effectiveness, and permanence of the considered remedial alternatives
- Region 2's FFS Model lacks a bioaccumulation modeling component necessary to understand the risk reduction associated with the considered alternatives
- The problems with Region 2's FFS Model invalidate the comparative analysis of alternatives central to the conclusions in the Draft FFS

CPG is not arguing that a numerical model is an inappropriate tool for evaluating remedial scenarios on the LPRSA, but rather that Region 2's FFS Model is not sufficiently developed to be a credible tool. This is supported by the fact that the Region's peer review of its incomplete and unsupported model is not scheduled to occur until February, 2013 – after the proposed CSTAG review of the Draft FFS. Region 2's model development ignores data sets that are critical to building a credible tool, and the FFS Model's behavior is inconsistent with the present understanding of sediment and contaminant dynamics in the LPRSA. The CPG is developing the RI/FS Model for the LPRSA and Newark Bay Study Areas (NBSA) under Region 2's oversight, which will address the noted shortcomings and incorporate all of the data sets presently being collected as part of the RI/FS process. CPG objects to Region 2's attempt to base remedial decisions on an incomplete model that is clearly incapable of accurately representing the physical processes that are occurring in the River and unable to support the evaluation of the massive and multi-billion dollar remedies under consideration.

No written documentation or model results of Region 2's FFS Model have been provided to the CPG for review, and it is the CPG's understanding that a complete model documentation and an external peer review will not be available until 2013. CPG's comments are based on knowledge gained during its development of the RI/FS Model for the LPR and Newark Bay, which is proceeding in parallel to Region 2's development of the FFS Model and which uses a similar modeling platform[8]. It is also informed by periodic meetings with Region 2's modeling team to provide modeling-related updates. The combination of these working meetings and the experiences in developing the RI/FS CFT Model are sufficient to understand several major limitations of the current FFS Model.

1a. *Important Elements of Contaminant Fate and Transport in the LPRSA*

A remedial strategy for the entire 17-mile, partially-mixed estuary that comprises the LPRSA will only be successful if the governing transport mechanisms are recognized for both the River and Newark Bay. The freshwater flow and tidal forcing dictate solids loadings, the shear stress environment, the position of the salinity front (i.e., the transition from tidal freshwater river flow conditions to estuarine flow conditions), and ultimately control the transport of salt, sediment, and COPCs. Broadly speaking, the COPC concentration distribution within LPRSA surface sediments depends on a balance of the following factors:

- **Tidal Processes:** Tidal currents cause periodic resuspension and deposition of a "mobile pool" (Geyer 1993) of fine sediments which exist as a "fluff layer" (a thin veneer of unconsolidated sediments), and the flood-dominance of tidal currents induces a net upstream "tidal pumping" of solids in the estuarine portion of the LPR. In addition, the

[8] In developing the RI/FS models under Region 2 oversight, CPG is required to use the same hydrodynamic and sediment transport code (ECOM-SEDZLJS) and CFT code (RCATOX) as a starting point, as laid out in Region 2's LPR Modeling Workplan for the RI/FS (Hydroqual 2006). However, CPG is free to implement changes if needed, subject to final approval by Region 2.

salinity intrusion induces a mean flow structure (the estuarine circulation) that transports solids upstream along the bottom of the estuary. These processes dominate during low-to-moderate flow conditions and give rise to infilling conditions.

- **Event Driven Scour:** High flow events flush the system and induce a net downstream solids transport, which may include sediment scour and COPC mobilization under sufficiently high flows, bringing COPC mass in deeper sediments to the surface.
- **Deposition/Burial:** A net depositional flux from the above processes moves COPC mass from the surface to deeper sediment layers, i.e., burial. The concentration on depositing particles is influenced by sorption processes in the water column.
- **Sediment Bed Processes:** Sediment mixing and diffusive processes exchange COPCs between surface and deeper sediments, and influence the flux to the water column.
- **Initial and Boundary Conditions:** Spatial gradients of COPC concentrations in surface sediments and loadings at the LPRSA boundaries affect the net flux of contaminants in a COPC-specific manner.

The success or failure or any remedy depends on the cumulative effect of these factors.

1b. *Role of the Contaminant Fate and Transport Model*

The CFT model[9] is a mathematical representation of the mechanisms governing the essential elements above. It aims to predict the behavior of contaminants in the LPRSA and Newark Bay with sufficient accuracy to inform our understanding of system behavior and of the effectiveness of the considered remedial alternatives. Specifically, it is meant to provide a means to evaluate the NCP criteria of overall protectiveness of human health and the environment, long-term effectiveness and permanence, and short-term effectiveness. However, "[m]odels will always be constrained by computational limitations, assumptions and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions." (NRC 2007). "The challenge . . . is determining when a model, despite its uncertainties, can be appropriately used to inform a decision" (EPA 2009).

1c. *Requirements of a Valid and Useful CFT Model*

EPA's modeling guidance (2009) stresses the importance of model evaluation, particularly for the type of use occurring with the Draft FFS, stating "... when the likely result of modeling will be costly control strategies and associated controversy, more detailed model evaluation may be necessary." There are many aspects to model evaluation. Most importantly, to fulfill its intended role to inform decision-makers, the model must have the following attributes:

- Conforms to the CSM
- Uses well-accepted representations of the essential elements of contaminant fate and transport
- Parameterization is reasonably constrained by calibration to multiple datasets comprising different temporal and spatial scales (e.g., water column trends over the tidal cycle and surface sediment trends over the long-term)

In short, for a model to be useful to decision-makers, it must be demonstrated that the model approximates the real system of interest sufficiently to serve as a basis for a decision.

[9] For simplicity, 'CFT model' is used as a blanket term to include all the individual components of the fate and transport calculation, including the hydrodynamic, sediment transport, and organic carbon sub-models.

2. Region 2's FFS Model Does Not Meet the Requirements of a Valid and Useful CFT Model

The Region 2 FFS Model does not meet the minimum criteria necessary to be used for decision-making. The text below focuses on two areas of concern:

- Incorrect representation of key transport process, which cause the model to behave in a manner that is inconsistent with the CSM
- Incomplete model calibration and validation

The CPG conducted simulations of the 1995 to 2010 calibration to evaluate the behavior of Region 2's FFS Model, using the latest versions of the source code and inputs provided by Region 2 -- all within the last year. In addition, the CPG simulated the 2010 to 2055 projection of Monitored Natural Recovery (MNR), in which the 1995 to 2010 calibration hydrodynamic and sediment transport output was cycled three times to drive a continuous CFT simulation, thereby generating predictions of the evolution of the contaminant distribution in the LPR over the period 1995 to 2055. To the CPG's knowledge, the code and input versions applied are the same as those used by Region 2 to evaluate remedies in the Draft FFS, since no calibration updates have been mentioned or provided by Region 2 at EPA-CPG model collaboration meetings. Nonetheless, there is some minor uncertainty on the details of how Region 2 runs the FFS models; however, that uncertainty does not prevent CPG from evaluating model behavior because the results generated are highly similar to those reported by Region 2, in that they reproduce the major features which are the focus of the CPG's comments. These results will be referenced throughout the sections that follow.

2a. FFS Model's Incorrect Representation of Key Transport Processes

Tidal Resuspension of Solids. In order to accurately predict the relevant upstream and downstream transport modes (see Section II(C)(1a)), the sediment transport model should reflect the existence of the distinct "fluff layer" (or "mobile pool") of unconsolidated sediments that exists within the LPRSA. The fluff layer is subject to resuspension over the course of the tidal cycle, and overlies a less erodible (consolidated) parent bed that would only be resuspended if shear stresses increased (i.e., due to a change in the tidal or freshwater forcings). Literature support for fluff layer formation is found in, for example, Sanford et al. (1991), Jones et al. (1996), Wang (2003), and El Ganaoui et al. (2004). Fluctuations in water column suspended solids over the course of a tidal cycle suggest a fluff layer thickness of a few mm or less. Some vertical exchange of material between the fluff layer and parent bed must occur over longer timescales[10], but over the course of a single tidal cycle the reservoir of material available for resuspension is limited to the existing fluff layer unless peak shear stresses increase due to a change in hydrodynamic forcing.

The sediment transport algorithm used in the FFS Model, SEDZLJ-S, attempts to mimic this structure by specifying a continuous transition in erosion properties from an unconsolidated surface to a consolidated bed using thin layers (1 mm). However, under its present parameterization, the Region 2 FFS model is for much of the domain unable to realistically represent the behavior of a distinct fluff layer, as illustrated by the following observations:

[10] For example, consolidation and organism uptake/defecation of sediment would move material downward into the parent bed, and physical disturbances due to organism activity would induce mixing at the interface.

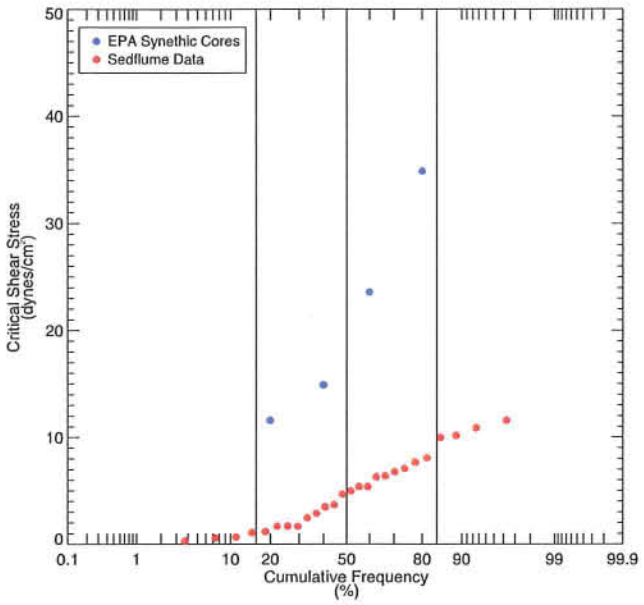


Figure 4 - Comparison of critical shear stresses for erosion for Sedflume cores and for EPA synthetic cores at the 15 cm layer.

1) The Region 2 FFS Model's sediment bed evolves to a state that is inconsistent with the data-based profile of erosion properties used to initialize the model. Within 15 days of model "spin-up" under low flow conditions[11], approximately 60% of the lower eight miles experiences net erosion and about 12% experiences a scour of 15 cm (6 inches; see Figure 4). Further scour in these areas is prevented by a sudden increase in the parameterized critical shear stress (Figure 5), which is an order-of-magnitude higher at 15 cm than for overlying layers. Although the use of a model "spin-up" to adjust properties such as bed composition is common practice in sediment transport modeling, the rapid scour Appendixed here indicates a fundamental problem with the parameterization of erosion properties used in Region 2's FFS Model. In particular, it indicates that the critical shear stresses and erosion rates that Region 2 inferred from the LPRSA Sedflume data are inconsistent with the shear stress environment predicted by the model. This conclusion is supported by the fact that the model bed in many other areas subsequently erodes down to the same 15 cm horizon during the simulation, with approximately 22% and 48% of the lower eight miles reaching that level within 1 year and 16 years of the simulation (Figure 4). Consequently, for much of the model domain, the data-based surface erosion properties are effectively replaced with those estimated to exist at a depth of 15 cm. **Moreover, this sudden increase in parameterized critical shear stress at 15 cm is not consistent with the underlying Sedflume data.** Region 2 used a fairly complicated methodology to map the measured bed erosion properties from Sedflume cores to the model domain, which is ultimately accomplished by collapsing the measured data into four synthetic cores of varying average erodibility. Each of these cores Appendixs the previously noted order-of-magnitude increase in critical shear stress for erosion at a depth of 15 cm (Figure 5), but this increase is not consistent with the underlying data set (Figure 6). The fact that this extreme and

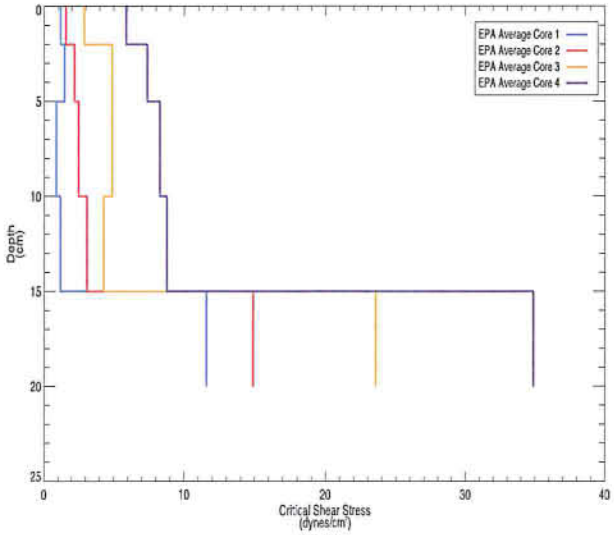


Figure 5 – Vertical profile of critical shear stress for erosion of EPA's synthetic cores

[11] The model was run from October 1, 1994, meaning effectively a one-year "spin-up" since Region 2's calibration begins October 1, 1995. The CPG is not aware of the exact model spin-up period used by Region 2.

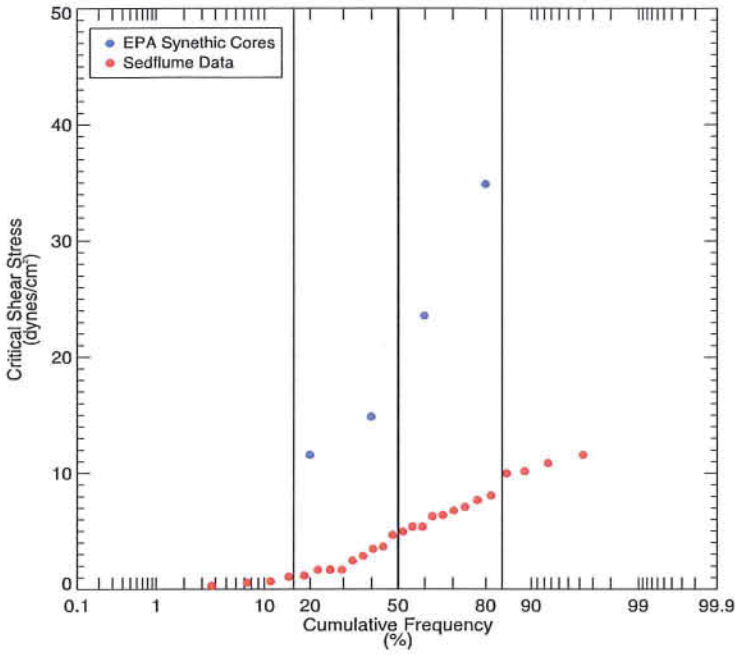


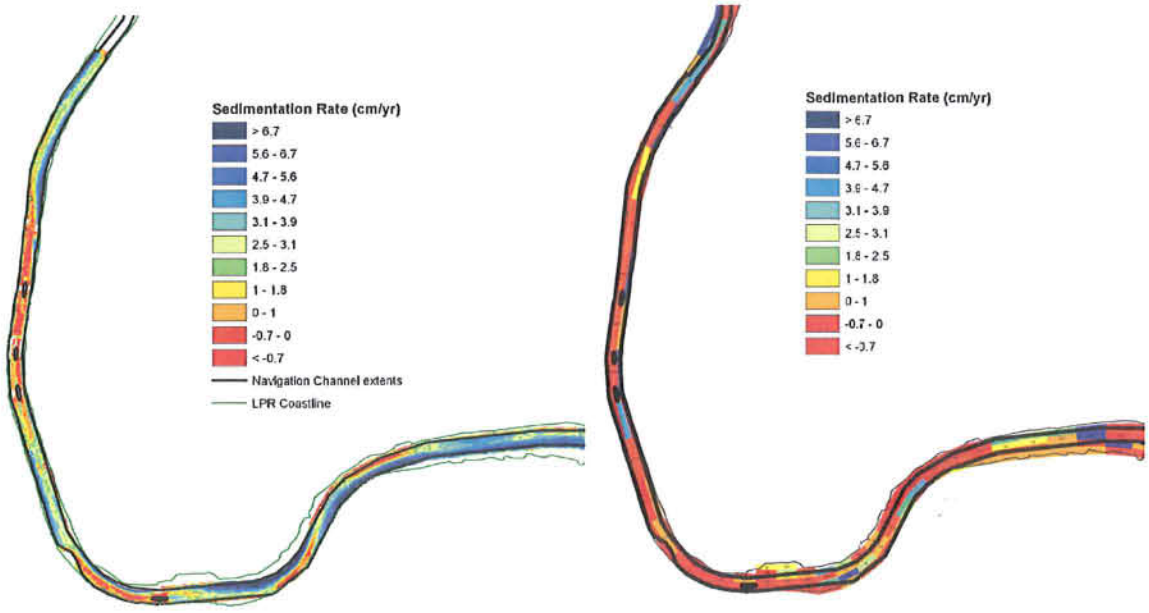
Figure 6 - Comparison of critical shear stresses for erosion for Sedflume cores and for EPA synthetic cores at the 15 cm layer.

artificial parameterization used in Region 2's FFS Model prevents erosion from progressing beyond 15 cm tends to mask the inherent disconnect between the erosion properties and the tidal shear stresses, which precludes the FFS model from behaving realistically under normal tidal conditions. Furthermore, since only 3% of the bed area erodes beyond 15 cm in the full 16-year simulation, the extreme parameterization also appears to control the model's high flow response.

2) The Region 2 FFS Model attempts to limit tidal resuspension via an unrealistic bed armoring process. In particular, the model allows the top layer of the bed ("active layer") to change its erosion properties from cohesive to non-cohesive and back again over the course of the tidal cycle. This high frequency change to the nature of the near-surface sediments, which limits resuspension by imposing a sudden increase in the critical shear stress for erosion, is unrealistic, not supported by empirical measurements, and to the CPG's knowledge, unprecedented. The fact that such an artifact is invoked every tidal cycle is taken as further evidence that the present model parameterization is not representing tidal resuspension in a realistic manner.

3) The Region 2 FFS Model does not predict widespread channel infilling. Net channel infilling is known to have occurred historically (e.g., see Region 2's system understanding [HQI/SEI 2011]) and is identified in EPA's sediment transport calibration/validation strategy (EPA 2010) as a process that the model must be able to reproduce. However, widespread infilling is not achieved by the Region 2 FFS Model because deposited sediment is assigned the highly erodible surface erosion properties discussed above, which as noted are not compatible with the local shear stress regime in many areas and therefore prevent widespread long-term sediment accumulation. The FFS Model's inability to predict channel infilling was confirmed via a simulation in which the bathymetry was modified to reflect the federally mandated navigation channel depths, i.e., the approximate historical condition prior to the extensive infilling that has occurred[12]. The simulation predicts net erosion or minor sedimentation in many channel areas that are known to have infilled significantly within the lower eight miles (Figure 7). As such, the FFS Model's predictions are inconsistent with observed bathymetric evolution in the lower River and with a key element of the sediment transport CSM. One likely consequence of this noted

[12] Initial bathymetry used for this simulation is an approximation of 1949 conditions in the LPR, Newark Bay, and the Kills. Bathymetry within the LPR was set to the federally mandated navigation channel depths (RM 0-2.6: 30 ft, RM 2.6-4: 20 ft, RM 4-7.8: 16 ft, RM 7.8-17.4: 10 ft, [all depths relative to MLW]). Within Newark Bay and the Kills, bathymetry was approximated based on USACE maps showing the historical evolution of Newark Bay. Major features represented accordingly are a 30 ft channel in the Kills leading to Port Newark and the LPR, and the absence of the Port Elizabeth, Port Elizabeth pierhead, and Elizabethport channels where bathymetry was instead set to 5 ft.



DATA (Evolution of post-dredge bathymetry over ~ 60 years)

MODEL (Evolution of post-dredge bathymetry over 10 years)

Figure 7 – Comparison of predicted net sedimentation rate during a simulation using historical bathymetry (right; CPG simulation of the Region 2 Model) to those inferred from historical bathymetric datasets (left).

inconsistency between the FFS Model and the CSM is a lack of post-remediation recontamination during projection runs, even though recontamination after remediation is a widely recognized phenomenon (see Section II(C)(3)).

Summarizing the above three points, a combination of parameterization issues and structural artifacts cause the FFS Model to unrealistically represent tidal resuspension of solids, and consequently the model cannot predict the fundamental process of sediment infilling following channel deepening due to dredging. Moreover, the model's predictions of solids mobilization during high flows are also influenced by an unrealistic parameterization of erosion properties. Section II(C)(3) describes how these factors compromise the reliability of the model to simulate the future evolution of contaminant distributions in the LPR as well as the effectiveness of remedial scenarios. It is also noted that the above issues are not insurmountable; the CPG's sediment transport model has generally overcome these issues via an alternate parameterization of erosion properties and code modifications to allow for a more realistic bed representation, with an easily erodible fluff layer overlying a more consolidated bed that is only active during episodic events.

Tidal Resuspension of COPCs. Moving beyond the FFS sediment transport algorithm, the representation of tidal resuspension and deposition within the COPC fate and transport calculation is also problematic. As illustrated in Section II(C)(3), it yields a strong export of contaminants from the surface sediment that is in the CPG's opinion exaggerated and inconsistent with the CSM. During each tidal cycle, resuspended particles reflecting the average concentration of the upper layer of the CFT model's bed (approximately 1 cm thick) are introduced to the water column, where they undergo instantaneous partitioning between the dissolved and particulate phases, i.e., rapid desorption. Likewise, particles that settle during slack water are assumed to instantaneously take on the average concentration of the top 1 cm

of the bed, i.e., the layer is assumed to be well-mixed. When repeated over many tidal cycles, this behavior gives rise to a type of "tidal pumping," [13] which efficiently transfers contaminants from the sediments to the water column during low-flow tidal resuspension. This mechanism has a cleansing effect on the bed that is, according to Region 2[14], the strongest contaminant loss mechanism from surface sediments within the model, dominating burial.

At this time, the CPG believes that exaggerated tidal pumping is at least partially attributable to a conceptual inconsistency in the FFS CFT model structure, which over-specifies the contaminant reservoir available for tidal resuspension. Assigning resuspended particle COPC concentrations based on the parent bed's 1-cm surface layer implies that there is no distinct millimeter-scale fluff layer, but rather that material from the parent bed is available to participate in tidal resuspension. Conceptually, particles in a fluff layer should not be in equilibrium with contaminants in the parent bed. Rather, these particles are expected to have sorbed concentrations closer to those of suspended particles. Studies suggest that the fluff layer contaminant inventory is expected to be replenished from the parent bed via slower exchange processes[15]. As such, the intra-tidal movement of fluff material may result in little net transport of COPCs between the water column and the parent bed.[16] Over-specifying the concentration on resuspended particles over-states the reduction in parent bed surface concentrations due to tidal pumping. In addition, the equilibrium partitioning assumption in the water column may also be contributing to the exaggerated influence of tidal pumping, by over-stating the transfer of mass from resuspended particles to the dissolved phase and to slower settling particles. These effects are being investigated as part of the CPG RI/FS CFT model development.

2b. Incomplete CFT Model Calibration and Validation

The calibration and validation of the FFS CFT model are incomplete. A model of a complex system such as the LPR needs to be compared to multiple and diverse datasets to be sure that the multitude of processes being modeled are properly specified and constrained; in other words, that the model is legitimately consistent with reality. This requirement is noted in general in Region 2's LPR Modeling Workplan (HQI 2006; see Section II(C)(5), and has guided the ongoing multi-million dollar LPR RI/FS contaminant data collection programs that have been designed and implemented under Region 2 oversight.

Region 2's CFT model has only been calibrated to mean surface sediment concentration changes between "snapshots" collected in 1995 and 2008/2009 (interim datasets are sparse). It is fully possible to tune the average long-term trend between two points in time for this single metric even if the representation of shorter term processes is unrealistic. The sediment trend is the net result of multiple processes occurring over shorter timescales and finer spatial scales, including low-to-moderate-flow tidal pumping, event driven scour, and deposition/burial (see Section II(C)(1a)). Because no attempt has been made to constrain these processes individually with available data, the calibration does not credibly establish that the overall dynamics of the surface sediment inventory are realistically simulated. Moreover, the model

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[13] "Tidal pumping" here refers to the correlation of erosion flux and COPC concentration, in analogy to its more common use to describe temporal correlation in velocity and scalar concentration.

[14] Verbal communication during the June 2012 EPA/CPG Model Collaboration Meeting.

[15] The contaminant inventory of the fluff layer would be replenished by particle mixing and a flux of dissolved or colloidal contaminant due to a number of processes which are typically lumped together and treated as a diffusive pore-water exchange.

[16] A lack of net transport during tidal resuspension was attributed to sorbed concentrations being in rough equilibrium with the water column in field measurements of mercury in the Hudson River (Heyes et al. 2004).

calibration target employed is only defined between approximately RM 1 to RM 7 due to the limited spatial range of the 1995 coring survey, meaning that the CFT model behavior upstream of RM 7 and downstream of RM 1 is unconstrained, as is the exchange between these areas and the RM 1 to RM 7 region. Lastly, the FFS CFT model-to-data comparisons that have been shown to date are inadequate even for the analysis of the long-term model performance in the lower eight miles, because they do not characterize the model's ability to reproduce trends on smaller spatial scales, thereby ignoring the spatial structure that both CPG and Region 2 have identified in the data (for example, such patterns are built into the "geomorphic units" approach used by Region 2 to set 1995 model initial conditions).

No significant attempts to validate the FFS CFT model calibration using other datasets have been conducted, to the knowledge of the CPG. Perhaps the most glaring omission is the absence of any calibration or validation to water column data; the ongoing Small Volume and the upcoming Large Volume Chemical Water Column Monitoring (CWCM) programs have been specifically designed under Region 2 Modeling Team's direction and oversight to capture a range of flow/tide conditions to allow calibration of the bed-water column interaction, and also better representation of boundary contaminant loadings.

In summary, neither the calibration approach nor the analysis of model performance that has been presented to CPG supports the validity of Region 2's FFS model as a tool to evaluate remedial alternatives encompassing either the entire lower eight miles or some subset of that region.

3. Region 2's FFS Model Does Not Produce Credible Predictions of the Protectiveness, Effectiveness, and Permanence of the Considered Remedial Alternatives

Several observations are presented below to illustrate the significant impact of the issues presented in Section II(C)(2) on the utility of the model to predict the efficacy of the proposed FFS remedial alternatives. Observations are based on projection results shown by

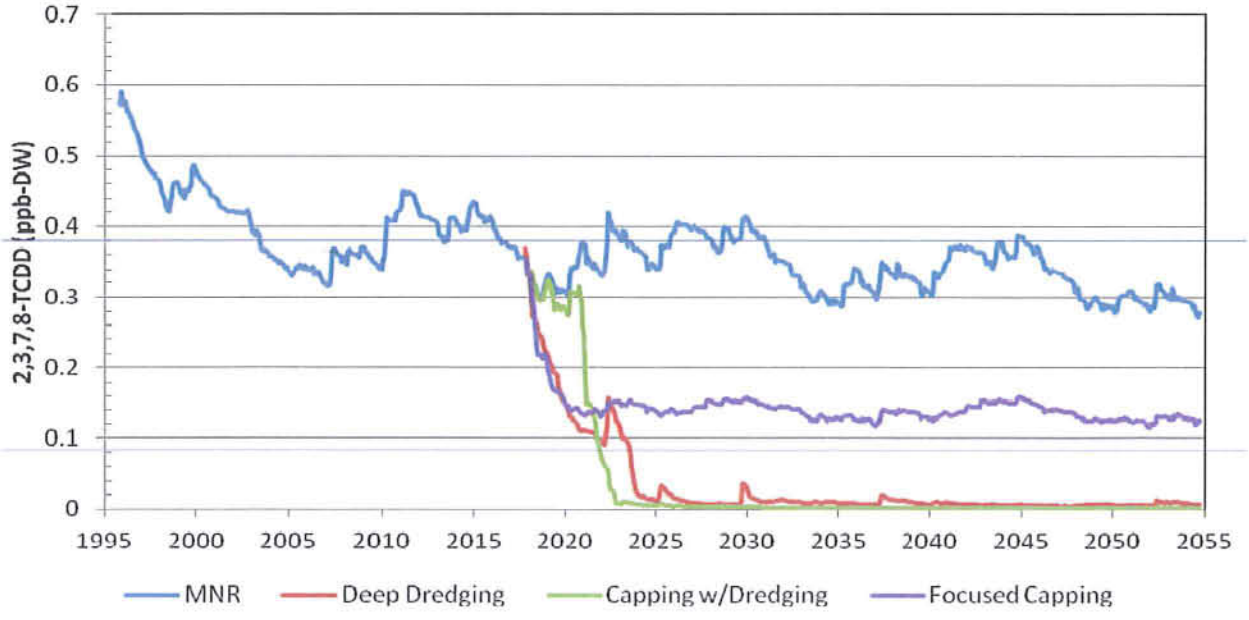

Figure 8 – EPA-predicted average surface sediment 2,3,7,8-TCDD concentration (top 6 inches) in the lower eight miles for the 1995 to 2010 calibration period, MNR, and the three other remedial alternatives under consideration by Region 2 in the FFS; from the September 2012 CAG meeting.

Region 2 to the LPR CAG at the September 2012 meeting for TCDD (Figure 8), as well as similar results shown for tetra-chlorinated PCBs and mercury at the June 2012 EPA/CPG Model Collaboration meeting (not shown here[17]). Over the interval from approximately 1995 to 2007, the average surface TCDD concentration in the top 15 cm (6 inches) of the lower eight miles declines to approximately half of its 1995 initial condition. There is subsequently a sharp increase in predicted average concentration in the 2007 to 2010 period, which is attributed to sediment bed scour associated with several high flow events. CPG observations on model behavior include:

a) Although the predicted average 0-15 cm concentration decline over the 1995-2010 calibration period is not inconsistent with estimates that may be inferred by comparing 1995 measurements to the major datasets collected in the interval 2008-2010, the predicted vertical concentration profile and surface contaminant inventory dynamics are unrealistic in the CPG's opinion, and entirely unconstrained by calibration (Figure 9, showing CPG results applying Region 2's model). The CPG's concerns with the predictions of the Region 2 Model in Figure 9 are as follows:

   i. The depletion of the near-surface sediments appears exaggerated (Figure 9, flag "A"), and is unconstrained by model calibration. The 0 to 15 cm (6-inch) average concentration presented by EPA consists of a strongly depleted 10-cm mixed layer (i.e., the depth to which particle mixing occurs) overlying a much more contaminated 10 to 15 cm layer (Figure 9, flag "B"). This is illustrated by the 0 to 10 cm average concentration trend, which is markedly different than the 0 to 15 cm trend. In particular, the 0 to 10 cm average declines to 1/6 of its value within about 12 years of simulation, with the few surface cm declining by about a factor of 20 (Figure 9, flag "C"). The depletion is caused by a combination of tidal pumping and burial.

   ii. Periodic scour events replenish the base of the 10-cm mixed layer with higher concentrations (Figure 9, flag "D") and deposits high concentrations on the surface (Figure 9, flag "E"). This newly introduced mass into the top 10 cm is then rapidly mixed towards the center of the mixing zone as well as removed by the tidal pumping effect. The model calibration does not provide any indication of whether this behavior is realistic, since the model is only calibrated to the net effect on 0 to 15 cm sediment concentrations (see Section II(C)(2b)) and the individual fluxes are not constrained by calibration.

[17] At this meeting, calibration and projection results were shown for 2,3,7,8-TCDD, tetra-chlorinated PCBs, and mercury, but have not been provided to CPG.

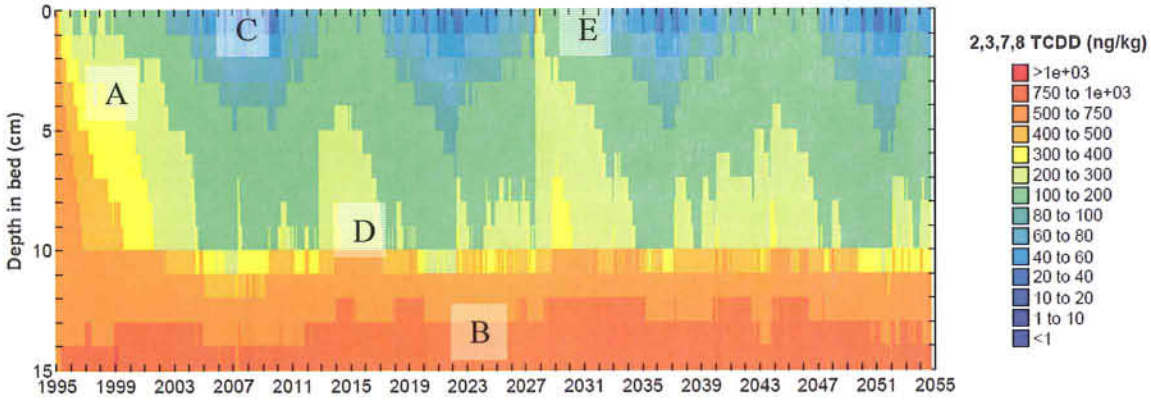

Figure 9 – Predicted average 2,3,7,8-TCDD concentration profile in the top 15 cm of the lower eight miles for the 1995 – 2010 calibration period and the MNR projection (CPG simulation of the Region 2 FFS Model).

The results suggest that Region 2's FFS Model presently compensates for an exaggerated low-flow export due to tidal pumping with an exaggerated recontamination during high flow events, and this behavior controls recovery, as discussed below.

b) The 45-year MNR projection cycles the 15-year calibration sediment transport fluxes three times to save computation time, resulting in three cycles of unrealistic rapid natural recovery followed by a sharp recontamination due to scour, and yielding a cyclic pattern that implies an arrested natural recovery. This behavior is controlled by the previously noted combinations of effects that are unconstrained by calibration and inconsistent with the CSM. Moreover, looping the sediment transport output effectively resets the sediment bed's erodibility in the areas that had previously scoured down to the 15-cm horizon of artificially stiff sediments (see Section II(C)(2a)), such that erosion is again specified in these areas even though new material was not deposited there. The resulting scour into legacy contaminants accumulates within the CFT model's sediment bed, meaning that the looping itself artificially contributes to a lack of recovery; this effect would be removed if the sediment transport model were instead run continuously. To summarize, Region 2's projection of the future surface sediment trends under MNR, including the greatly slowed natural recovery following 2010, is not credible because of the aforementioned problems with the representation of transport processes, inadequate calibration, and improper application of sediment transport fluxes during projections. Conceptually, a continuation of natural recovery is expected, since solids entering the LPR from upstream and downstream contain on average much lower TCDD concentrations, and would continue to dilute surface concentrations; this would be expected even in areas that do not experience net long-term sedimentation since incoming sediments would mix with in-river sediments during alternating periods of low-flow infilling and high flow re-mobilization, to on average reduce surface concentrations.

c) The projection results for both the FFS "Dredging and Capping" and "Deep Dredging" scenarios predict concentrations of near zero in the lower eight miles of the LPR with minimal recontamination in the decades following remediation, despite the lack of remedial action outside of RM 0 to RM 8 (see Figure 8 for the TCDD result; a similar lack of predicted recontamination has been observed for tetra-chlorinated PCBs and mercury). Both the initial concentration reduction and the lack of subsequent recontamination from upstream (above RM 8) and downstream sources (i.e., Newark Bay) are consistent with the FFS Model's lack of predicted infilling and the dominance of the tidal pumping effect. However, both are inconsistent with expectations as:

- Elevated concentrations of TCDD and other COPCs have been measured in sediments in RM 8-13 and in Newark Bay.
- For PCBs and mercury, contributions of upstream sources, combined sewer overflows (CSOs), and tributaries to Newark Bay (the Kills and the Hackensack) would also be expected.
- The release of material within RM 0 to RM 8 during dredging would be expected to re-contaminate previously remediated areas.

Consequently, Region 2's FFS Model projections are not a credible prediction of future recovery of the surface sediments under active remediation scenarios.

d) The initial concentration achieved by remedial scenarios in Figure 8 may also be confounded by unrealistic assumptions about the implementation of the remedial alternatives, as well as the neglect of the solids release associated with dredging releases of contaminants[18].

e) The "Focused Capping" scenario shows an initial concentration reduction of about half the other active remediation scenarios, followed by a fairly flat trajectory that mirrors the MNR trajectory. This prediction of slow recovery following remediation is subject to the same severe shortcomings as the MNR prediction described above.

It is important to recognize that the above effects do not only compromise the accuracy of the surface sediment recovery trajectories in an absolute sense, but also the predicted relative efficacy of the remedial scenarios. Consequently, Region 2's FFS Model projections of surface sediment trends are not a credible basis for a remedy decision.

4. Region 2's FFS Model Lacks a Bioaccumulation Modeling Component Necessary to Understand the Risk Reduction Associated with the Considered Alternatives

Exposure to COPCs via consumption of fish is the primary concern being addressed by the FFS. The perceived risk is proportional to the COPC concentrations in the fish and the risk reduction attributed to the considered remedial alternatives is calculated using assumed reductions in those concentrations.

Region 2 does not include in the FFS a mechanistic bioaccumulation model, which is necessary to accurately predict future fish tissue concentrations. Such models have been a routine component of modeling at other Superfund sites (e.g., Hudson River, Grasse River, Housatonic River, Fox River), and are a requirement of Region 2's Modeling Workplan for the LPR RI/FS (HQI 2006) and the May 2007 AOC for the entire 17 mile RI/FS. Rather, the FFS assumes that changes in fish COPCs will be in direct proportion to predicted reductions in the average surface sediment COPC concentrations in the lower eight miles of the LPR. To the best of the CPG's knowledge, Region 2 has made no effort to validate this assumption and no effort to examine the available site-specific data to understand how COPC patterns in fish relate to COPC patterns in the environment.

A calibrated bioaccumulation model is needed to understand the extent to which the considered alternatives will reduce COPC levels in fish. Bioaccumulation is complicated by the spatial variations in contamination, fish movement and the degree to which the food web is tied to the water column and to surface sediment concentration. For example, eel in the lower 14 miles have essentially the same average TCDD concentration whereas blue crabs captured in

[18] Verbal communication at the June 2012 EPA/CPG Model Collaboration meeting. Region 2 noted ongoing efforts to add solids releases to projections, but no results were shared with CPG.

the lower 6 miles have higher average concentrations than blue crabs captured above RM 8. These food chain patterns cannot be explained by the spatial patterns of average TCDD concentration in surface sediments (0 to 6 inches). Particularly vexing issues that could be answered by a bioaccumulation model include the following influences:

- Sources upstream of RM 8 (both within the LPR and coming over the Dundee Dam) and downstream of RM 0
- Fish movement and preferred habitat
- Resuspension during prolonged remediation.

It is conceivable and perhaps likely that the fish will respond much less to remediation in RM 0-8 than is indicated by the change in average surface sediment COPC levels. It is also possible, to the extent that fish exposure is driven by habitat, that remediation in habitat areas may be more effective than indicated by the change in the average RM 0-8 surface sediment COPC concentrations. Absent a calibrated bioaccumulation model, Region 2's evaluation of alternatives is incomplete and flawed.

Citing reasons similar to those outlined above, Region 2 specifically identified the need for a bioaccumulation model in its 2006 Modeling Workplan for the LPRSA RI/FS: *"Based on the preliminary evaluations, bioaccumulation model evaluations are needed: (1) to provide a more detailed understanding of chemical accumulation in the Passaic River food web; (2) to test bioaccumulation model calculations against additional field data; (3) to evaluate the link between current contaminant discharges and in-place sediment contamination and levels in the biota; and (4) to evaluate the response of the biota to changes in the contaminant concentrations in the water column and in sediments"* (HQI 2006). To the CPG's knowledge, Region 2 has not subsequently provided arguments demonstrating that credible evaluations of the relative risk reduction of various remedial scenarios are possible in the absence of a robust bioaccumulation model.

5. The Problems with Region 2's FFS Model Invalidate the Comparative Analysis of Alternatives That Is Central To the Conclusions of the FFS

Region 2's model does not realistically represent the processes most critical to COPC fate, including the interactions of COPCs between the water column and sediment, and the trapping of incoming solids. Thus, it cannot identify the areas of the river that drive risk, the rate of natural recovery or the impact of recontamination by incoming solids. As a result, it cannot provide confident estimates of the relative benefits of alternative remedial strategies. Moreover, the lack of a calibrated bioaccumulation model makes it impossible for the model to evaluate a targeted remedy that might have enhanced benefits in habitat areas.

Lastly, it is noted that Region 2's Model does not take proper account of the recommendations of CSTAG in April, 2008.[19] For example, contaminant load estimates have not been updated to include the latest data, numerical model results have not been adequately compared to EMBM results, and the impact of recontamination associated with ongoing sources and resuspension during remediation have not been adequately accounted for (per previous comments on model behavior).[20]

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[19] See column [F] of the chart attached hereto as Appendix 1 for a full discussion of the 2008 CSTAG Recommendations and the Region's failure to comply with same.

[20] See Appendix 4 for references.

III. THE DRAFT FFS IS LEGALLY INDEFENSIBLE

A. It is Arbitrary and Capricious to Request Comments on a Document That Has Not Been Released for Review

The Draft FFS has not been released to the public or to the CPG. The CPG has been informed about its contents only to the extent that Region 2 has revealed those contents to the public, such as in presentations made to the CAG, during informal discussions held between Region 2 and the CPG, and in the Stakeholder Summary. None of these documents or presentations identified Region 2's preferred alternative. Nevertheless, Region 2 is scheduled to present the Draft FFS to NRRB for review in December, 2012 and advised the CPG of its opportunity to "submit comments concerning issues related to the selection of a remedy for the lower eight miles" of the LPRSA, which "should summarize. . . any technical issues [the CPG] think[s] are pertinent to the cleanup decision, including [our] rationale and [our] recommended approach to the cleanup." Region 2's request that the CPG provide such comments without having released the full Draft FFS is arbitrary and capricious. *See U.S. v. Town of Moreau, N.Y.*, 751 F. Supp. 1044 (N.D.N.Y. 1990); *U.S. v. Iron Mountain Mines, Inc.*, 987 F.Supp. 1250, 1255 (E.D. Cal. 1997). Other than the Stakeholder Summary, the CPG still does not know what the "cleanup decision" is and has only limited information regarding the alternatives under consideration. In light of the anticipated breadth and excessive cost of the Region's proposed remedy, the Region's refusal to provide the full Draft FFS to the CPG to allow the CPG a fair opportunity to review and comment on such a significant document is patently unreasonable and inconsistent with CERCLA. It is also contrary to the Office of Management and Budget's December 8, 2009 Open Government Directive, which "direct[ed] executive departments and agencies to take specific actions to implement the principles of transparency, participation, and collaboration."

B. The Draft FFS is Irreconcilably Inconsistent with the RI/FS

Based on the information provided to the public by Region 2 , the Region is advancing alternatives in the Draft FFS that are similar to and based upon the alternatives presented in the 2007 Draft FFS. The 2007 Draft FFS was severely criticized by the CPG and others, including CSTAG. As noted above, the CPG asks that the NRRB review the CPG's February 1, 2011 comments attached as Appendix 5, as well as those of CSTAG carefully, because the CPG does not believe that Region 2 has adequately addressed those comments. For example CSTAG urged the Region to consider all the data developed during the course of the RI/FS, but all indications are that the Region has failed to do so in the Draft FFS.

At the time the CPG entered into the RI/FS AOC in May 2007, the CPG understood that interim or early actions were being considered by Region 2. However, the CPG did not agree that the FFS would supplant its work to provide all necessary information for remedial selection in the LPRSA. Indeed, the RI/FS AOC provides that the work conducted under the agreement "shall provide all appropriate and necessary information to assess [LPRSA] conditions and evaluate alternatives to the extent necessary *to select a remedy* that will be consistent with CERCLA . . ." RI/FS AOC at ¶13 (emphasis added). Further, "the final RI/FS report as approved by EPA, and the Administrative Record, shall provide the basis for the proposed plan(s) that will be issued by EPA under CERCLA. . ." Id. at ¶38. Region 2's issuance of the Draft FFS, which selects a final remedy for nearly half of the RI/FS study area effectively breaches the RI/FS AOC.

Moreover, the CPG's position that it will not perform or fund any of the Draft FFS alternatives is even stronger at this point, as the CPG has made extensive progress under the RI/FS AOC by completing numerous data collection efforts, analyzing thousands of sediment,

water and biota samples, many of which have been ignored by Region 2 in the Draft FFS, and developing hydrodynamic, sediment transport, and contaminant fate and transport models. Moreover, the Region has directed the CPG to conduct further sampling of the LPRSA to complete the RI/FS. Obviously, the data from these sampling events are also not considered in the Draft FFS. The issuance of the Draft FFS now, more than five years after the Region issued the 2007 Draft FFS, is even more arbitrary and capricious given that the RI/FS, which will provide a comprehensive and supported view of the entire LPRSA, is scheduled to be completed during the second quarter of 2015. It makes no sense to proceed with the Draft FFS when the NCP-compliant RI/FS is so close to completion. Furthermore, it makes no sense for the Region to advance the Draft FFS until all the data, including the data yet to be collected, is available to be considered. The Region's rush to issue an unfinished and unsupported Draft FFS, shortly before the completion of the NCP sanctioned RI/FS is unprecedented and clearly an effort to select a remedy that is not supported by the data or the NCP process, but rather one which the Region is set on pushing through. The CPG will not fund such a remedy.

C. The Draft FFS is Inconsistent with the NCP

The NCP requires that a remedial investigation be performed prior to the selection of a final remedy "to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives." 40 CFR § 300.430(d)(1); *see also* 40 CFR § 300.430(e)(1) ("[d]evelopment of alternatives shall be fully integrated with the site characterization activities of the remedial investigation. . ."). Although labeled as a "Remedial Investigation-Focused Feasibility Study," Region 2 has circumvented the remedial investigation requirement under the NCP and explicitly contemplated under the RI/FS AOC. Specifically, the Region relies on inadequate data and fails to develop alternatives based on a comprehensive site characterization to make its "final" remedy selection decision.

Moreover, the active remedial alternatives presented in the Stakeholder Summary do not meet the criteria for an early action under the NCP. The NCP provides that "[s]ites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup." 40 CFR § 300.430(a)(ii)(A). It further provides that "[o]perable units, including interim action operable units, should not be inconsistent with nor preclude implementation of the expected final remedy." 40 CFR § 300.430(a)(ii)(B).

The Draft FFS active remedial alternatives, however, are not "early" actions and will not achieve significant risk reduction "quickly" or "expedite the completion of total site cleanup," as set forth in detail in Section II(B) of these comments. Moreover, there is simply no way of knowing whether the active Draft FFS alternatives will be inconsistent with or preclude implementation of the rest of the final remedial action for the LPRSA, because the Draft FFS is itself the final action for the lower eight miles of the LPRSA. It is clear, however, that either of the active Draft FFS remedial alternatives will effectively eliminate any targeted or adaptive management approaches to remediation of the sediments. In contrast, the Alternative Remedy described in Section IV can be started sooner than the Draft FFS remedy, can achieve risk reduction more quickly. Consistent with the Sediment Guidance, the Alternative Remedy is exactly the sort of "phased analysis" that is "appropriate given the size [and] complexity of th[is] site." *See* 40 CFR § 300.430(a)(ii)(A).

None of the active bank-to-bank remedial alternatives identified by Region 2 in the Draft FFS should have survived the NCP's development and screening analysis for remedial alternatives. *See* 40 CFR § 300.430(e)(7). As set forth in Section II(B), the alternatives are "technically... infeasible" and "would require equipment... [and] facilities that are not available

within a reasonable period of time." Id. at § 300.430(e)(7)(ii). Further, the estimated costs of the active alternatives presented by Region 2 are significantly understated and "grossly excessive compared to the overall effectiveness of [the] alternatives." § 300.430(e)(7)(iii). In accordance with the Sediment Guidance, high remedy costs can also lead to a decision to phase a cleanup, such as is proposed in the Alternative Remedy.

Furthermore, EPA's 2007 Draft FFS failed to provide a sufficiently detailed analysis of the NCP's nine criteria for evaluating alternatives, as set forth in the CPG's prior comments to CSTAG. *See* 40 CFR § 300.430(e)(9). Region 2 has since offered barely a cursory analysis of the remedy selection criteria in its presentations to the public and in the CAG Summary, which is unacceptable and violative of the NCP, given the enormous scale of each of the Draft FFS alternatives.[21] *See* 40 CFR 300.430(e)(iii) ("The analysis of alternatives under review shall reflect the scope and complexity of site problems and alternatives being evaluated.").

For example, and as further provided in Appendix 6, Region 2 has continuously failed to adequately analyze key issues such as implementability and duration, with appropriate and realistic consideration of dredging sequencing, infrastructure limitations, River geography, and fish migration windows. Further, the Region must consider the potential impacts to the surrounding communities from a large-scale dredging and capping project that can be expected to cause major disruptions to utility services and transportation access and to result in air emissions and odors for a period of 20 to 30 years. Based on information made available to the public, the Region has also not addressed the issue of resuspension of contaminants through either deep dredging or capping with dredging.

Finally, the Draft FFS screened out an alternative described as "Focused Capping with Dredging for Flooding," stating that the alternative was "[n]ot evaluated, because [this] Alternative [] is not protective." However, in developing the Draft FFS alternatives, Region 2 fails to consider critical data that is and will become available, and relies on an invalid and incomplete contaminant fate and transport model, which leads it to inaccurate conclusions. In addition, apparently no consideration was given to the adaptive management approach or the possibility of combining the active alternatives with other measures, such as monitored natural recovery, to achieve protectiveness. The NRRB should urge the Region, in the strongest of terms, to give full consideration to the Alternative Remedy, which embodies such an approach, before the other active alternatives in the Draft FFS are further considered.

D. The Draft FFS Fails to Address CSTAG's Comments or to Adhere to the Principles and Sediment Guidance

On April 1, 2008, CSTAG provided written recommendations to Region 2 with respect to the 2007 Draft FFS. CSTAG presented a point-by-point analysis to demonstrate why Region 2 had not followed the Principles. Although the CPG has not seen the Draft FFS, information made available to the public suggests that Region 2 has not followed those recommendations, the Principles, or the Sediment Guidance, and instead has arbitrarily and capriciously selected a *final* remedy for the FFS Study Area.[22]

To demonstrate, in accordance with Principle #1 to "control sources early," CSTAG recommended that "the Region needs to evaluate more quantitatively the relative contribution of risks from dioxin and PCBs entering from upstream (i.e., over Dundee Dam), from tributaries,

[21] A chart comparing the Alternative Remedy with the Draft FFS's consistency with the NCP's nine remedy selection criteria is appended hereto as Appendix 6.

[22] A chart comparing the Alternative Remedy with the Draft FFS's consistency with the Principles and CSTAG's 2008 recommendations is appended hereto as Appendix 1.

from [CSOs], and from instream sediments above mile eight and from Newark Bay." *See also* Sediment Guidance at 1-5 (one of the key risk management principles" is to control sources early); *id.* at 55 ("[b]efore initiating any remediation, active or natural, it is important that point and nonpoint sources of contamination be identified and controlled"). However, instead of proposing measures to eliminate or control ongoing sources of contamination to the lower eight miles of the LPRSA, Region 2 apparently ignores this comment and minimizes their significance.

The most obvious example is the potential source of contamination from the upper nine miles of the LPRSA. The CPG's agreement to conduct a time critical removal of the contaminated sediment at RM 10.9 demonstrates the importance of this issue. By failing to address the risks presented to the FFS Study Area by the high levels of contamination found in the upper nine miles, Region 2 would continue its approach of washing windows from the bottom up, directly contrary to the Principles. Region 2 has also elected not to consider the results of the CSO Study that is currently underway pursuant to an AOC Region 2 signed with Tierra. The Phase 1 collection is currently scheduled to start in late 2012.

Principle #4 advocates the development and refinement of a CSM that considers sediment stability. Region 2's CSM has not been provided to the CPG, but it is understood to depict a lack of sediment stability in RM 0-8, when the available data, some of which the Region has apparently not considered, shows that much of the sediment in RM 0-8 is stable. It would appear that Region 2's CSM fails to consider all necessary data, including the 2009 benthic data, the 2012 bathymetry study, and 2012 Supplemental Sampling data, and thus is unable to reach complete or accurate conclusions. The NRRB should urge the Region to consider this data, which show a definite pattern of sediment stability.

Significantly, Region 2 proposes to release the Draft FFS without completing the modeling necessary to predict the effectiveness of the proposed alternative remedies or consider any targeted remedial scenarios for comparison. Although Region 2 is scheduled to present the Draft FFS to NRRB in December, it is not scheduled to form and brief its modeling peer review team until late January 2013, and the final review of its model will not be completed until August 2013. This is an illogical, and arbitrary and capricious schedule. CSTAG had recommended, given "the potential size and cost of an early action," that the Region's model be subjected to external peer review. That process has not yet occurred and will not be completed until well *after* Region 2 presents its final remedy to NRRB.

In the 2007 Draft FFS, Region 2 relied upon screening level risk assessments to measure the effectiveness of the remedial alternatives to reduce risk, and to select what Region 2 described as a final action for the sediments in the lower eight miles of the river. Those screening level risk assessments used highly conservative assumptions appropriate for a screening level exercise, but inappropriate for making final remedial decisions. Use of screening level risk assessments to select a final remedial action was inappropriate and inconsistent with EPA guidance, even in the 2007 Draft FFS, but the CPG understands that Region 2 intends to use overly conservative and non site specific assumptions in constructing the baseline risk assessment to be incorporated in the Draft FFS. Further, EPA's desire for regional consistency in lieu of a more realistic site-specific approach, effectively blurs the important distinction between risk assessment and risk management, which EPA's own guidance dictates should be separate steps in the RI/FS decision-making process. That blurring is inappropriate and should be challenged by the NRRB. Instead, realistic assumptions, based on actual site-specific data, or data gathered from comparable sites, should be used. Examples of such data are the background and reference data being collected by the CPG in the RI/FS process that Region 2 is ignoring, including data the Region has directed the CPG to collect above Dundee Dam. These results may well demonstrate that the sediments in the lower eight

miles of the LPRSA do not present the unacceptable risk Region 2 has claimed, or that the alternative remedial action proposed by Region 2 will not have the risk reduction result claimed by Region 2.

In contrast to Region 2's unprecedented issuance of the Draft FFS, the CPG is committed to completing the RI/FS by early 2015 pursuant to the processes dictated by the NCP. Through such work, the CPG is developing the Alternative Remedy, which ongoing data collection and modeling will serve to refine. As described below, upon completion, the Alternative Remedy will be compliant with the NCP, and will closely follow the Principles and the Sediment Guidance. In short, the Alternative Remedy will be consistent with the national approach adopted by EPA for the remediation of complex sediment sites.

IV. THE NRRB/CSTAG SHOULD STRONGLY RECOMMEND THAT REGION 2 CONSIDER THE ALTERNATIVE REMEDY AS A SUPERIOR ALTERNATIVE TO THE DRAFT FFS REMEDIES

The CPG is committed to assessing sediment impacts and reducing risk associated with impacted sediment in the LPRSA under the direction of the EPA. To achieve this objective, the CPG has accelerated its work on the FS portion of the RI/FS.[23] The Alternative Remedy currently being developed should be thoroughly considered before any action is taken on the Draft FFS.

The Alternative Remedy is not limited to the lower eight miles addressed by the Draft FFS but covers the entire 17 mile LPRSA and will provide a comprehensive and well balanced approach. The extensive data collected during the RI/FS has lead to a system understanding of the behavior of the LPRSA, which is incorporated into the CPG CSM. The data demonstrate that there is definite structure to the distribution of concentrations of TCDD and other COCs in the LPRSA sediments. These patterns are consistent with the CPG's understanding of the river. Although much of the sediment in the LPRSA is stable, there are areas of the river where targeted removal and isolation of contaminated sediments is an appropriate and effective remedy.

These targeted areas are responsible for much of the human and ecological risk because they contain much of the persistent COCs at concentrations in sediments significantly above urban background levels. These areas also represent potential ongoing sources of impact to other locations of the River through erosion and diffusion to the water column. Therefore, these sediments should be considered to be the focus of any remedial activities that address human health and the environment for the entire LPRSA. By contrast, the stable sediments do not present such risks and should be left alone.

Integration of existing data has allowed for an initial delineation of these areas, and ongoing studies will serve to further refine those delineations. Targeted removal and isolation of these areas is expected to provide significantly greater short-term risk reduction than can be achieved by the Draft FFS alternatives and this risk-reduction can be achieved in a shorter time frame. Preliminary analysis indicates that average surface concentrations of TCDD, the predominant risk driver in the LPRSA, can be reduced by approximately 80% by focusing on less than 150 acres of the LPRSA and by removing less than 450,000 CY of TCDD-contaminated sediments. Such a targeted approach that addresses the entire LPRSA overcomes many of the limitations of the active Draft FFS alternatives, including minimizing potential recontamination from the upper nine miles and limiting sediment resuspension during

[23] The CPG submitted the FS Workplan to the Region in 2009, but has not yet received comments on the submission.

dredging. Furthermore, the Alternative Remedy would provide progress toward risk reductions that would ultimately meet EPA's acceptable ranges for protectiveness in a time frame that is comparable to the Draft FFS alternatives.

Implementation of the Alternative Remedy would provide the following benefits:

- It comprehensively addresses the entire LPRSA and not just the lower eight miles;
- It has been developed based on an understanding of *all* the data collected as part of the ongoing RI/FS, using multiple lines of evidence;
- The Alternative Remedy minimizes the potential for recontamination of the Lower eight miles, which is critical since some of the highest TCDD concentrations are found above RM 8;
- It focuses on the main risk driver (TCDD) and allows the other contaminants to recover to background;
- It minimizes the potential for dredging resuspension because far less sediment is disturbed.
- It is more realistic and will be completed in a much shorter time frame and can attain risk reduction comparable to the Draft FFS alternatives; and
- It allows the LPRSA to begin to recover sooner than the Draft FFS alternatives.

Approach to the Alternative Remedy

The focused, targeted remediation is part of a comprehensive vision for the LPRSA that will reduce potentially unacceptable risks to human health and the environment, improve sediment quality and enhance the value of the River for the community. The Alternative Remedy achieves significant risk reduction relatively quickly by focusing on key areas of the entire LPRSA with elevated surficial sediment concentrations that are inhibiting the natural recovery of the River. The remaining areas of the sediment bed in the LPRSA are not disturbed, minimizing resuspension of contaminated sediments typically associated with large dredging projects. The Alternative Remedy can be designed and implemented more rapidly than EPA's alternatives with limited disturbance to the River, thereby enhancing the natural recovery of the river. The approach to the Alternative Remedy is based on a foundation of extensive data evaluation and integration conducted by the CPG to understand the structure of the data and the factors controlling the recovery of the River.

Given the size and the complexity of the LPRSA and the urbanized estuary setting, remediation must be implemented to ensure successful recovery of the River (Figure 10). The Alternative Remedy is a comprehensive remediation strategy addressing the entire study area and focusing on remediation of areas that, when addressed, are expected to have the greatest impact on recovery. After the Alternative Remedy is implemented, if subsequent monitoring indicates that the River is not improving as expected, data will be evaluated to determine whether additional activities are warranted to further support and enhance the rate of recovery of the River, as part of EPA's remedy review. This approach is consistent with the Principles and Sediment Guidance, which encourage such adaptive management approaches at complex sites.

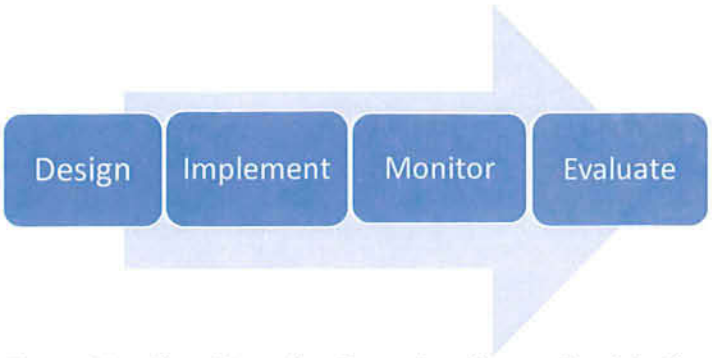

Figure 10 - The Alternative Remedy relies on the Adaptive Management Approach consistent with EPA's sediment management guidance and policy.

The Alternative Remedy focuses on sediments that pose the greatest potential risk to the system, and specifically, the COCs that drive the greatest risk. Risk evaluations conducted indicate that TCDD drives the majority of the risk in the LPRSA. Therefore, a focused removal targeted at sediments with elevated surficial concentrations of TCDD (which tend to be co-located with other COPCs)[24] will efficiently and effectively reduce the overall risk. The remediation of sediments within these targeted areas will have both short-term (significant initial surficial sediment concentration and associated risk reduction) and long-term (enhanced recovery rates) benefits to the River. The extent of these benefits is a function of the area to be remediated, but at some point the remediation of additional areas provides little additional benefit relative to the increased duration and level of effort. In other words, the relationship of the area remediated and the extent of the benefits is not linear, but rather asymptotic. An evaluation of the area (acres) that would need to be remediated for a range of target threshold concentrations (Figure 11) suggests a range of concentrations of approximately 500-1000 ppt of TCDD where remediation efficiency is maximized. Additionally, a similar range of TCDD concentrations for use as remedial action levels optimizes the efficacy of the remedial action. Targeting threshold concentrations below this range would result in a significantly larger remedy, with (1) a marginal benefit in further surficial concentration and associated risk reduction and enhanced recovery; and (2) increased disturbance and resuspension of COPCs over a longer duration. Moreover, it would not meet the NCP's cost-effectiveness requirement as the cost would not be proportional to its overall effectiveness.[25]

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[24] While the CPG is advocating development of the Alternative Remedy based on removal of TCDD, the CPG continues to assert that the CPG is a *de minimis* group of parties that are not associated with the Diamond Alkali site and the TCDD related thereto, which is the most significant COC and the main human health risk driver.

[25] "Each remedial action selected shall be cost effective....A remedy shall be cost effective if its costs are proportional to its overall effectiveness." 40 C.F.R.§300.430(f)(1)(ii)(D). To determine whether the costs are proportional to its overall effectiveness, the preamble to the NCP recommends the following comparative analysis: "In analyzing an individual alternative, the decision-maker should compare, using best professional judgment, the relative magnitude of cost to effectiveness of that alternative. In comparing alternatives to one another, the decision-maker should examine incremental cost differences in relation to incremental differences in effectiveness." 55 Fed. Reg. 8728 (March 9, 1990)

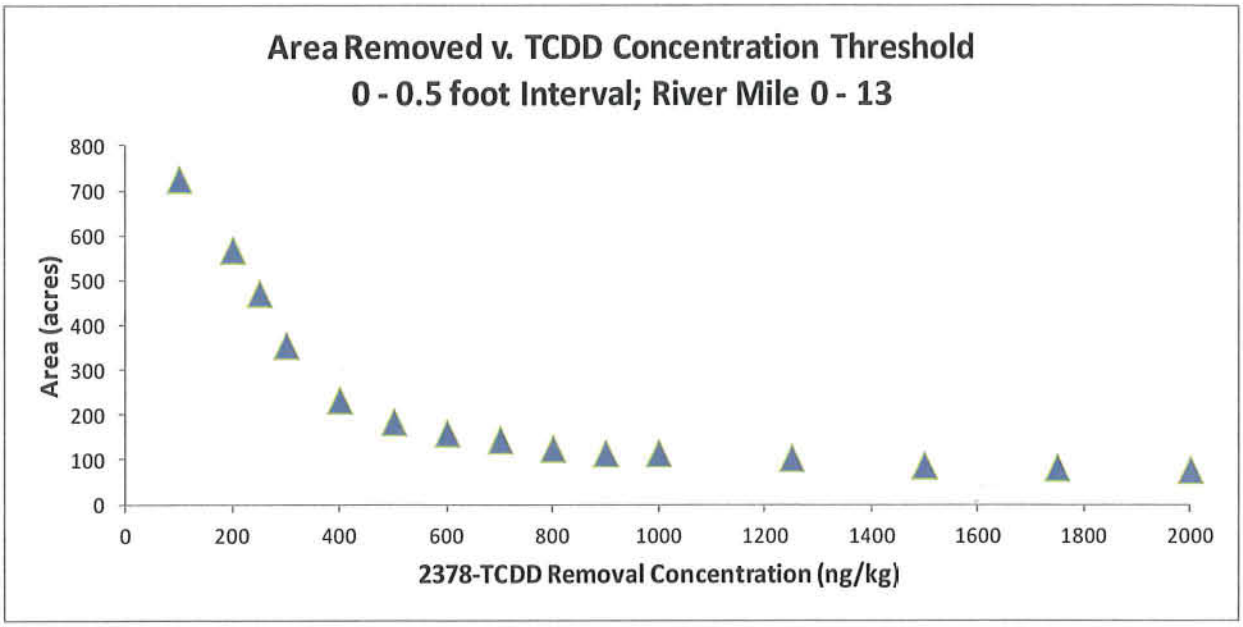

Figure 11 - The Surficial Sediment Data provide a threshold removal efficiency

Data Structure in the LPRSA

Many data sets have been collected as part of the ongoing RI including: (1) multiple rounds of sediment sampling (with analyses for physical, chemical and radiochemical parameters); (2) several bathymetric surveys; (3) physical and chemical water column monitoring; and (4) analysis of benthic and fish tissue. Data have been collected throughout the LPRSA, and a focused data collection program has been performed at RM 10.9, where the CPG will perform a Removal Action in the summer of 2013. These data support an understanding of the nature and extent of contaminants and the fate and transport patterns in the LPRSA that is best addressed by the Alternative Remedy (rather than the remedies proposed in the Draft FFS), both through evaluation of the data and application of the data to initialize and calibrate the numerical models.

The current conceptual understanding of the LPRSA, based on the integration of the multiple data sets, indicates that there is significant structure in the River and that the patterns and fate of contaminants are generally understood. CPG evaluations include: (1) characterizing the extent of chemical contamination; (2) analyzing radiochemistry data to estimate net sedimentation rates; (3) comparing sediment concentrations in the LPRSA with upstream and downstream locations; and (4) evaluating apparent changes (i.e., elevation and morphological) in bed surface between recent bathymetry surveys, with particular attention focused on the post-Hurricane Irene (2011) bathymetric survey. The data were used to understand historic and present day sediment stability, to characterize any ongoing sediment source areas of contamination, and to better identify risk exposure areas to support development of a targeted remedy focused on effectively reducing unacceptable risks to human health and ecological receptors.

The integration of the data indicates several characteristics that suggest that an adaptive, *targeted* remedy that is focused on areas of elevated surficial sediment concentrations is appropriate for the LPRSA. The sediment cores consistently show that elevated concentrations of contaminants which are buried at depth in the sediment bed have remained stable for decades. These sediments continue to remain stable today, as evidenced by relatively shallow erosion during the passage of Hurricane Irene, a greater than a 100-year storm event. Thus, these older, stable sediments do not pose risk to human health or the

ecosystem, because the COPCs associated with these stable sediments are deeply buried and unlikely to be exposed; that is, the COPCs are not bioavailable, nor are they bioaccessible. Thus, their disturbance and removal now will not contribute to recovery of the LPRSA; rather, the unnecessary disturbance of these sediments would create a significant detriment to the river as this would mobilize a significant mass of contaminants, and would result in long-term negative impacts to the LPRSA, Newark Bay and the ecosystem. The lines of evidence which inform the targeted remedy (and many of which the Region has ignored in its Draft FFS) further demonstrate that surficial sediment COPCs in much of the river channel reflects relatively consistent concentrations, and anthropogenic COCs are recovering to urban/anthropogenic background concentrations, as indicated by the observed decline between 1995 and 2008 sediment concentrations for several COCs in RM 1-7. Both TCDD and Total PCBs *declined by approximately 40%* over this 13-year period, a recovery rate of 3% per year (Figure 12). Recovery is also evident in the fish and blue crab tissue data, where recent (2009) TCDD-TEQ fish tissue concentrations were 32% to 64% lower than historical concentrations (Figure 13). The decline in sediment and tissue concentrations is expected to continue until concentrations in the LPRSA are in equilibrium with background conditions, expected over the next several decades.

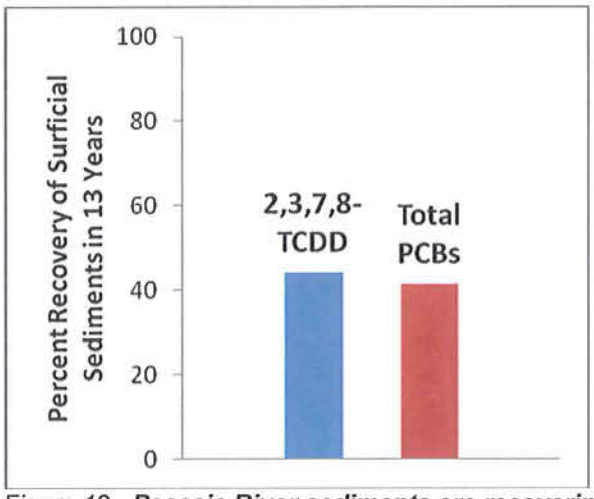

Figure 12 ***-Passaic River sediments are recovering*** *- TCDD and Total PCBs sediment concentrations decreased by approximately 40% between RM 1-7 between 1995 and 2008*

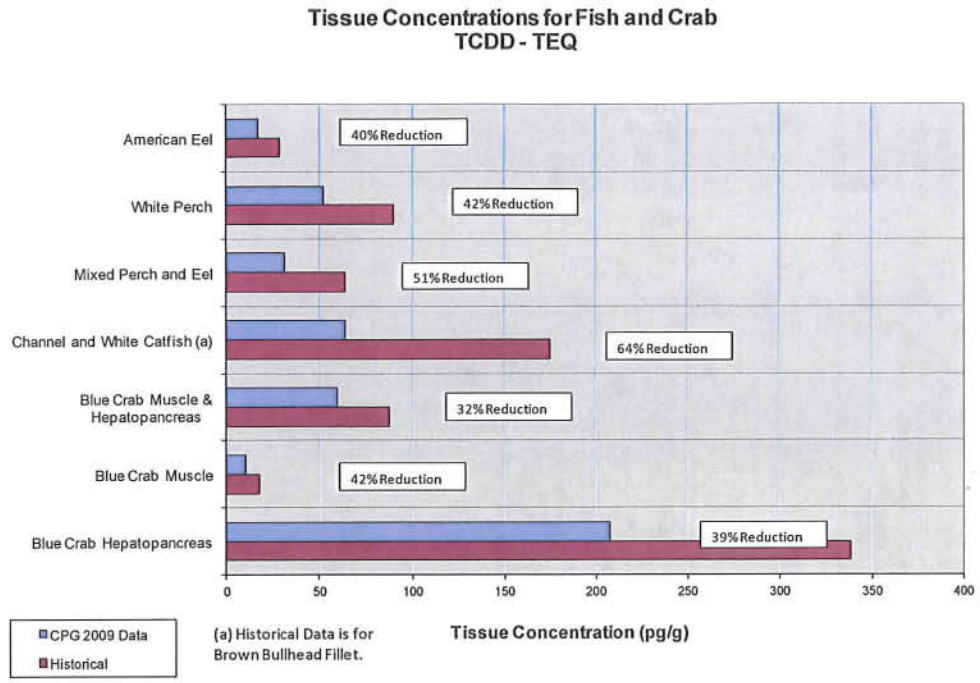

*Figure 13 – **Passaic fish and blue crab are recovering** - concentration of TCDD-TEQ in several species of fish and blue crab tissue have decreased significantly between 1999 and 2009*

The evaluation of the data defines two characteristic areas that may pose the greatest human and ecological risk, and/or may be providing ongoing sources of contaminants to the LPRSA – these areas should be targeted for efficient and effective remediation:

1. Areas where episodic sediment erosion is observed, and where older sediments with elevated COC concentrations are exposed in the surficial sediments. The periodic erosion of these limited areas could provide a source of contaminated sediments to the rest of the River, slowing natural recovery. These areas were observed primarily below RM 7.
2. Areas where elevated concentrations are observed at or near the surface, and where ongoing recovery has slowed or ceased (e.g., RM 10.9). Although the sediment and radiochemistry core profiles suggest these areas are generally stable, they are potential areas of human health and ecological exposure. These areas are primarily located above RM 7. These areas of elevated surficial sediment concentrations are potential sources of TCDD, and other COCs which are co-located, that may be inhibiting recovery of the river and driving human health and ecological risk in the River.

The Alternative Remedy focuses on these areas to reduce risk and promote recovery of the River.

The data collection effort performed at RM 10.9 (to support the design of the Removal Action) provides an extensive and detailed data set that furthers the understanding of the contaminant patterns in the LPRSA and illustrates the effectiveness and the efficiency of the targeted approach to sediment remediation and risk reduction. The dense sediment sampling grid at RM 10.9 allows for an accurate delineation of surficial sediments with elevated contaminant concentrations (Figure 14) and shows that elevated concentrations are located in fine-grained sediments on a mudflat along the inner bend. Sediment concentrations decline rapidly outside of the silt deposit. The radiochemical data show that the sediments are stable, and sediments with elevated concentrations at depth in the sediment bed are not subject to resuspension and can be left in place as they are not expected to recontaminate other parts of

the LPRSA. Elevated concentrations of TCDD are generally co-located with elevated concentrations of Total PCBs and mercury, supporting the conclusion that a removal focused on TCDD will also provide significant reductions in surface sediment concentrations of other COCs. The conceptual understanding of LPRSA sediments provided by the RI/FS data and refined by the RM 10.9 data collection, demonstrates that remediation in focused areas with elevated sediment COC concentrations is supported by the data and will achieve significant overall risk reduction.

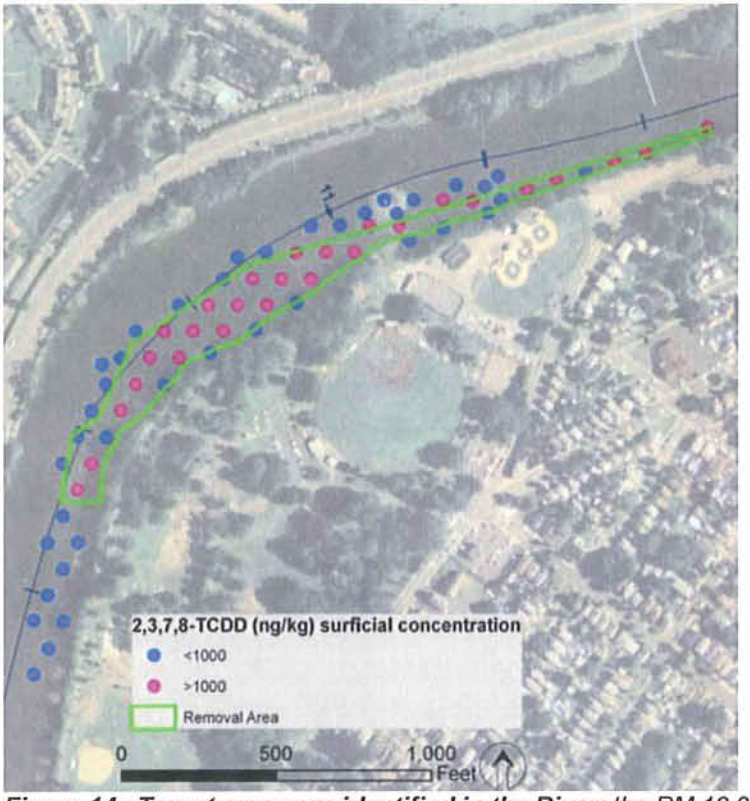

Figure 14 –Target areas are identified in the River; *the RM 10.9 Characterization clearly identified a distinct – well defined area of high concentrations*

Delineation of Target Areas

Target areas can be delineated to identify areas where elevated surficial sediment concentrations are contributing to risk and inhibiting recovery of the LPRSA based on available data and a set of delineation rules. The process for identifying target areas has been developed by the CPG, and a preliminary set of target areas has been delineated. These target areas will be refined in the course of the NCP-compliant RI/FS process, as pre-design investigations and numerical model predictions are completed. The preliminary locations for the target areas were initially selected based on sediment contaminant concentration data, where Surficial TCDD concentrations exceeded a selected threshold concentration (e.g., 500 to 1,000 ppt). Once the locations of the target areas were identified, the areas were further delineated based on multiple lines of evidence from all available data (rather than the limited data utilized by the Region in selecting the remedy in the Draft FFS).

The removal of sediments from within the targeted areas provides immediate benefit to the LPRSA with significant reduction to the average surficial sediment concentrations. For example, using a target threshold TCDD concentration of 500 ppt, 125 acres are delineated within the targeted areas (approximate 12% of the riverbed below RM 13[Figure 15]), resulting in approximately 80% initial reduction of TCDD concentrations in the surficial sediments. Initial

reductions in surficial sediment concentrations will result in rapid reductions in human health and ecological risk and will enhance the natural recovery of the system.

Figure 15 ***Approximately 100 acres of the river have been identified as Target Areas*** *throughout the LPRSA*

Advantages of the Alternative Remedy

When compared with the large-scale dredging alternatives proposed in the Draft FFS, the Alternative Remedy provides a focused removal of the sediments that are inhibiting recovery and driving potentially unacceptable risk, and can be implemented in a significantly shorter time (See Section II(B)). The completion of the Alternative Remedy in a fraction of the time required for Region 2's Draft FFS alternatives means less disruption to the LPRSA (including disruption to daily activities in the dense urban and suburban neighborhood such as traffic, recreational activities, destruction of a greater extent of benthic habitat, and increased release of COCs and residuals), allowing recovery to begin earlier, resulting in improved river conditions much more quickly. In addition, the shorter duration and extent of dredging will limit sediment resuspension and provide significantly greater short-term risk reduction that can be achieved by the Draft FFS alternatives. A targeted approach that addresses the entire LPRSA in an upstream to downstream manner overcomes many of the limitations of the Draft FFS including potential recontamination of the lower eight miles from the upper nine miles.

The implementation of the Alternative Remedy can be expected to enhance the recovery of the system. When compared with the Draft FFS (Figure 16), remediation activities can be completed in a shorter time (e.g., 5 years vs. ~20 years, see Section II(B)), resulting in more rapid initial reduction of surficial sediment concentrations and associated risk, and ultimately after many years, similar total reduction. When compared with the Draft FFS (RM 0-8), the initial reduction realized by the Alternative Remedy is greater than that of the Draft FFS, resulting in a more effective and less disruptive remedy. Further, the simple comparison (Figure 16) does not include the impacts of residuals, resuspension, and recontamination. Because of

the scale of the Draft FFS remedial alternatives, these factors will have a greater impact on the Region 2's preferred active alternatives than on the Alternative Remedy.

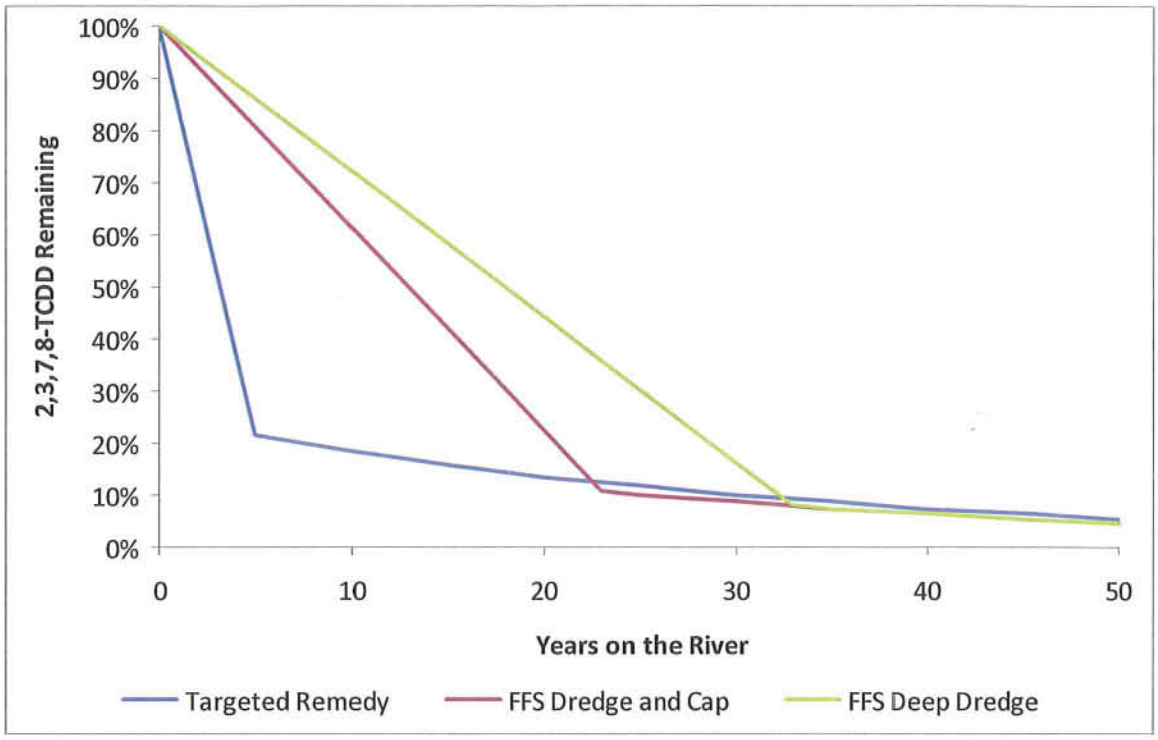

Figure 16: Reduction over Time - Alternative Remedy and FFS

As presented in more detail in Section II(B), the implementation of any remedy in the LPRSA will be extremely difficult and challenging due to the dense urban setting, the multiple bridges and structures along the River, the lack of available space to stage operations, and the desire to minimize disturbances to the residents and recreational users of the River. All of these factors will contribute to duration, disruption, and cost of any remedy. As discussed above, the Alternative Remedy was designed to achieve similar benefits as the Draft FFS alternatives, while minimizing disruption and resuspension, and implementation time in a cost effective manner. The limited additional assumed benefit of the Draft FFS alternatives does not justify the significant additional expenditure and time required for its completion, violating the NCP requirement that costs be proportional to the remedy's overall effectiveness. Moreover, the Region's proposed dredge and cap remedy is not likely to achieve the predicted reduction in the TCDD concentration present in sediments given the extensive resuspension of sediments and release of COCs that will occur during the implementation of the Draft FFS remedies, the generation of residuals, and the recontamination by ongoing sources (including potential upstream, in-channel sources) that will occur post-construction..

The Alternative Remedy is focused on reduction of human health and ecological risks throughout the entire LPRSA. Addressing sediments that are contributing to risk and inhibiting recovery will create conditions in the River that enhance the ongoing recovery and promote improved sediment and water quality. As the water and sediment quality recover to background conditions, the habitat and ecological services in the River can be meaningfully enhanced and improved, providing increased value of the ecosystem and the River to the community. Following implementation of the Alternative Remedy, ongoing monitoring will be performed to assess the recovery of the system, and future remedial actions, if necessary, may be evaluated and, if necessary, implemented, to achieve the desired reductions in risks to human health and ecological receptors.

The Alternative Remedy is Consistent with the NCP, the Principles and the Sediment Guidance

Sediment sites present unique challenges, including the potential for a large number of sources, sediment movement, engineering challenges, and multiple stakeholders, all of which render aspects of the cleanup process more complex than at sites with soil or groundwater contamination alone. *See* Sediment Guidance at 1-3 – 1-4. This is precisely the case with the LPRSA, particularly given its tidal nature. For these reasons, the Sediment Guidance encourages the use of adaptive management practices at sediment sites, "especially at complex sites to provide additional certainty of information to support decisions." *Id.* at 2-22. "[T]his means testing of hypotheses and conclusions and reevaluating site assumptions as new information is gathered." *Id. See also* Principle #5.[26]

The CPG has collected an extensive amount of data pursuant to the RI/FS AOC and has accelerated its work on the FS portion of the study. Through such work, the CPG has been able to delineate the targeted areas outlined above, which ongoing RI/FS-consistent analysis will serve to refine. Thus, the CPG's application of multiple "lines of evidence" to support the decision-making process is consistent with the adaptive management approach and falls "within the context of EPA's existing remedial process." Sediment Guidance at 1-7; 2-25.

The Sediment Guidance provides that "a phased approach to site characterization, remedy selection, or remedy implementation may be the best or only practical option," and "may be especially useful at sites where contaminant fate and transport processes are not well understood[,] the remedy has significant implementation uncertainties[,] . . . [or] the effectiveness of source control is in doubt." Sediment Guidance at 2-21 – 2-22. High remedy costs, such as at issue here, can also lead to a decision to phase a cleanup. As applied here, these factors weigh strongly in favor of such a phased approach for the LPRSA, as offered by the Alternative Remedy. In fact, an example of an early action provided in the Sediment Guidance includes "[c]apping, excavation, or dredging of localized areas of contaminated sediment that pose a very high risk" -- an action being demonstrated by the CPG's Removal Action at RM 10.9 and consistent with the broader Alternative Remedy. Sediment Guidance at 2-23.

The Alternative Remedy will achieve significant risk reduction relatively quickly and over the long-term by focusing on specific areas with elevated surficial sediment concentrations that are inhibiting the natural recovery of the River. Principle #1 is to control sources early, and "areas of higher contaminant concentration may act as continuing sources for less-contaminated areas." Sediment Guidance at 2-20. The remaining areas of the sediment bed in the LPRSA will not be disturbed, minimizing resuspension of contaminated sediments. Thus, it can be designed and implemented in a relatively short time frame with limited disturbance. This approach is consistent with Principle #10, which is to "design remedies to minimize short-term risks while achieving long-term protection." Faster implementation will result in less adverse impacts on recreational uses of the River, road traffic, noise, and air pollution, and will avoid the implementation and duration issues associated with the Draft FFS identified in Section II(B).

The Alternative Remedy will serve to more quickly enhance the natural recovery of the River. This is an accepted approach under EPA guidance, which recognizes that "risk reduction due to natural burial through sedimentation is more common and can be an acceptable sediment management option. . . Therefore, isolation and mixing of contaminants through natural sedimentation is the process most frequently relied upon for contaminated sediment." Sediment Guidance at 4-1; see also Highlight 4-2 (outlining site conditions especially conducive

[26] As noted above, a chart comparing the Alternative Remedy versus the Draft FFS's consistency with the Principles and CSTAG's 2008 recommendations is appended hereto as Appendix 1.

to natural recovery, including where, as here, contaminant concentrations in biota are moving towards risk-based goals on their own). Further, "MNR is likely to be effective most quickly in depositional environments after source control actions and active remediation of any high risk sediment have been completed," such as proposed by the CPG. Sediment Guidance at 4-11. Consistent with the adaptive management approach and Principle #11 to "monitor during and after sediment remediation to assess and document remedy effectiveness," if subsequent monitoring indicates that the River is not improving as expected, additional remedial activities will be evaluated to further support and enhance the rate of recovery of the River.

The Alternative Remedy is also compliant with the NCP's criteria for remedy selection.[27] The two threshold NCP criteria are: (1) protectiveness; (2) and compliance with ARARs. 40 C.F.R. 300.430(f)(1)(i)(A). It is anticipated that the Alternative Remedy will achieve protectiveness and be ARAR-compliant, upon completion. Moreover, the Alternative Remedy also meets the NCP requirement that costs be proportional to the overall effectiveness of the remedy. 40 C.F.R. §300.430(f)(1)(ii)(D)

The protectiveness "criterion is used to evaluate how the alternative *as a whole* achieves and maintains protection of human health and the environment." Sediment Guidance at 3-5 (emphasis added). It refers to protection from unacceptable risks by reducing exposures to levels established during the development of remediation goals and "draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs." 300.430(e)(9)(iii)(A).

The Sediment Guidance explains that, "[t]he time needed until protectiveness is achieved can be difficult to assess at sediment sites, especially where bioaccumulative contaminants are present. Generally, for sites where risk is due to contaminants in the food chain [e.g., the LPRSA], the time to achieve protection can be estimated using models. . ." Sediment Guidance at 3-14. Further, "the attainment of sediment cleanup levels may not coincide with the attainment of [remedial action objectives ("RAOs")]. . . Where cleanup levels have been achieved but progress towards meeting RAOs is not as expected, the five-year review process . . . should be used to assess whether additional actions are needed." *Id.* at 2-17. Therefore, as further described above, the RI/FS model under development will be used to estimate the time to achieve protectiveness from implementation of the Alternative Remedy. Based on the CPG's understanding of the system and employing the iterative approach, it is anticipated that the time to do so will be comparable to the Draft FFS. Thus, the Alternative Remedy will be effective and permanent, yet implemented at a fraction of the time and cost of the Draft FFS, with much less disturbance to the communities adjacent to the River.

[27] A chart comparing the Targeted Remedy versus FFS's consistency with the NCP's nine remedy selection criteria is also appended hereto as Appendix 6.

Appendix 1
Draft FFS Versus Alternative Remedy Consistency with Contaminated Sediment Principles

[A] Contaminated Sediment Management Principles	[B] Draft FFS	[C] Comments Regarding Draft FFS	[D] Alternative Remedy	[E] Comments Regarding Alternative Remedy	[F] Region 2's Compliance with CSTAG's 2008 Recommendation
1. Control Sources Early.	**Inconsistent**	The Draft FFS fails to address ongoing sources, and thus, the FFS Study Area is likely to be subject to recontamination. • Using the largest and most current data set, the CPG has estimated an average surface concentration of 1,000 ppt of 2.3.7.8-TCDD above RM 8. This would serve as a continuing source of 2,3,7,8-TCDD recontamination to the FFS Study Area. • Based on the CPG's understanding of the data, since the Upper Passaic River and Newark Bay are sources of sediment to the LPR, the fact that these areas have COPC concentrations about equal to (or greater than) those in the LPRSA means they must be controlling surface sediment concentrations in the LPRSA. This is supported by the latest data which show that, with the exception of TCDD, concentrations of all other COPCs in surface sediment are approaching regional background concentrations. ▪ Region 2 relies on a limited set of data (i.e., CARP and 2008 MPI data) and fails to wait for and consider the data from Tierra CSO Phase 1 Study that it has approved and signed an AOC with Tierra to perform.. The Phase 1 data collection is currently scheduled to start in late 2012 or early 2013. ▪ Region 2 fails to consider a significant volume of sediment, surface water and other environmental data that has collected. All these data have been deemed necessary by Region 2 in order to complete the RI/FS. See Section II(A)(I) of the CPG's comments, which outlines the data being ignored by Region 2.	**Consistent**	The CPG developed the Alternative Remedy using multiple lines of evidence based on all of the data available to date. The Alternative Remedy will remediate high concentration areas, while minimizing the resuspension of contaminants in the FFS Study Area. In encompassing the entire 17 mile LPRSA, it will also reduce re-contamination of the less contaminated areas in the FFS Study Area. As the Alternative Remedy is refined, it will incorporate the remaining data to be collected under the RI/FS, as well as the Phase I data to be collected by Tierra pursuant to the CSO AOC.	Region 2 has failed to comply with CSTAG's 2008 recommendation. CSTAG specifically stated that the "Region needs to evaluate more quantitatively the relative contribution of risks . . . from upstream (i.e., over Dundee Dam), from tributaries, from [CSOs], and from instream sediments above mile eight and from Newark Bay." The CPG is in the process of collecting data above Dundee Dam, and Tierra will be collecting CSO data for Phase 1 of the CSO Study. Moreover, the current RI/FS data show that, contrary to Region 2's conclusions in the Draft FFS, certain sediments above RM 8 have higher surficial TCDD concentrations than what is found in the lower 8 miles.
2. Involve the Community Early and Often.	**Consistent in Some Respects**	In its 2008 comments, CSTAG recommended that Region 2 "should consider sharing site information earlier and provide more frequent updates as new data become available." Instead, Region 2 has continued to provide periodic, virtually identical briefings to the public since 2008, which depict a matrix of alternatives initially presented in the 2007 Draft FFS. Only recently during the September 18, 2012 CAG meeting and in the Stakeholder Summary did EPA present limited updated information regarding the alternatives being considered. However, the Draft FFS has still not been released to the public or the CPG.	**Consistent**	The CPG is committed to working with EPA, the CAG, and local communities and stakeholders to develop the Alternative Remedy. This alternative can be implemented faster and will result in less adverse impacts on recreational uses of the River, road traffic, noise, and air pollution. The CPG has initiated a process to fully inform the CAG and community stakeholders about the Alternative Remedy and additional actions that can benefit the public and enhance use of the River system.	As outlined in Column [C], Region 2 is partially in compliance with this recommendation; however, the Region could do significantly more to bring stakeholders into the process earlier and to provide more frequent and more substantive updates. The Region's updates are cursory and rarely provide any significant analysis.
3. Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees.	**Consistent**	The CPG understands that Region 2 has been conferring with New Jersey and the Natural Resource Trustees regarding the Draft FFS.	**To be determined**	The CPG is committed to working with EPA, New Jersey, and the Natural Resource Trustees to ensure that all viewpoints are considered in the completion of the RI/FS and refinement of the Alternative Remedy.	CSTAG made a series of recommendations, including, but not limited to: (1) clarifying the roles and regulatory responsibilities of the partner agencies, such as what work is being done as part of the Corps' restoration effort under WRDA; and (2) consult the Region's water program regarding the timing of any expected CSO improvements and evaluate whether these affect the effectiveness and/or

Appendix 1
Draft FFS Versus Alternative Remedy Consistency with Contaminated Sediment Principles

[A] Contaminated Sediment Management Principles	[B] Draft FFS	[C] Comments Regarding Draft FFS	[D] Alternative Remedy	[E] Comments Regarding Alternative Remedy	[F] Region 2's Compliance with CSTAG's 2008 Recommendation
					timing of any proposed remedy. The Region has failed to include stakeholders in the critically important discussion of the broader vision for the entire LPRSA.
4. Develop and Refine a Conceptual Site Model that Considers Sediment Stability.	**Inconsistent**	Region 2's CSM has not been provided to the CPG. However, based on the Draft FFS, it is evident that Region 2's CSM fails to consider all necessary data, including the 2011-2012 surface water sampling, 2011 and 2012 bathymetry surveys and 2012 Supplemental Sediment Sampling data, and thus is unable to accurately describe the key physical, chemical and biological processes that determine the transport and fate of contaminants. An accurate CSM is critical to the development, evaluation and selection of an effective remedy.	**Consistent**	The CPG's current draft CSM, which the CPG is preparing to submit to Region 2, reflects data that have been gathered through the RI/FS process and will continue to be refined as the RI/FS is completed.	The Region has failed to comply with CSTAG's 2008 recommendation that the Region "[c]ompare the underlying assumptions for the bases for the CSMs as described in the FFS for the early action plan and in the longer-term RI/FS, and if necessary, align them in order to ensure that data from future sampling efforts will be used in all remedy decisions." At the outset, this recommendation is even more critical now that the Region is purporting to select a ***final*** remedy for RM 0-8. Yet, from what the CPG knows, the Region has certainly not aligned the two processes (which are likely to result in inconsistent conclusions) and does not have a mechanism for ensuring that future sampling efforts are used in all remedy decisions. To the contrary, recent and planned RI/FS sampling efforts are being excluded from a ***final*** remedy decision.
5. Use an Iterative Approach in a Risk-Based Framework.	**Inconsistent**	CSTAG recommended that Region 2 should give consideration to adding one or more limited early action alternatives that address highly contaminated, erosional areas within the lower 8 miles. CSTAG also recommended that the Region perform additional analyses to evaluate the effectiveness of these limited early actions. The Stakeholder Summary outlines a limited alternative of focused capping with dredging, but summarily rejects it for evaluation because the Region alleges that it is not protective. However, the Region's failure to include all available data in its Draft FFS has led the Region to a series of incorrect conclusions. Further, the contaminant fate and transport model used for the Draft FFS is flawed and incomplete, and does not accurately represent known transport processes (especially for low flow periods). The model results are inadequate with respect to model calibration/validation, and are inconsistent with the CSM. Therefore, it is currently impossible to determine protectiveness for a purported *final* remedy including a targeted alternative for the FFS Study Area.	**Consistent**	The Alternative Remedy is an interim remedy consistent with the CSTAG's 2008 recommendation, which will continue to be refined using all available data. Thus, "[e]ach iteration might provide additional certainty and information to support further risk-management decisions, or it might require a course correction." Principle #5. Implementation of the Alternative Remedy will achieve a significant level of risk reduction relatively quickly by focusing on specific areas with elevated surficial sediment concentration that are driving risk and inhibiting the natural recovery of the River. The remaining areas of the sediment bed in the LPRSA will not be disturbed, which will minimize resuspension of contaminated sediments. If subsequent monitoring indicates that the River is not improving as expected, additional remedial activities will be evaluated to further support and enhance the risk reduction and rate of recovery of the River.	The Region has failed to comply with CSTAG's 2008 recommendation described in Column [C]. Selecting a final, massive monolithic remedy for a portion of the study area is the antithesis of an iterative approach. Furthermore, as discussed in detail in these comments, the Region has failed to use all available RI/FS data in its evaluation of the Draft FFS, which directly conflicts with CSTAG's recommendation that the "Region should use the information being collected as part of the RI/FS for the 17-mile LPR to refine the CSM and verify the basis for the early actions proposed for the lower eight miles."

Appendix 1
Draft FFS Versus Alternative Remedy Consistency with Contaminated Sediment Principles

[A] Contaminated Sediment Management Principles	[B] Draft FFS	[C] Comments Regarding Draft FFS	[D] Alternative Remedy	[E] Comments Regarding Alternative Remedy	[F] Region 2's Compliance with CSTAG's 2008 Recommendation
6. Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models.	**Inconsistent**	The Draft FFS excludes significant amounts of data, representing hundreds of sampling location where sediment, tissues and water have and will be collected between 2008 and 2013, including background and reference data that the CPG is currently collecting above Dundee Dam. Region 2's FFS Model does not meet the requirements of a valid and useful contaminant fate and transport model, including the representation of transport process, inadequate model calibration/validation, and inconsistency with the CSM. Although Region 2 is scheduled to present the Draft FFS to NRRB in December 2012, it is not scheduled to form and brief its peer review team until late January 2013, and the final review of its model will not be completed until August 2013. This is an illogical, and arbitrary and capricious schedule.	**Consistent**	The Contaminant Fate and Transport Model under development by the CPG will include all of the data that Region 2 has directed the CPG and Tierra to collect, yet is being excluded by Region 2 in its model. The CPG's RI/FS Model will follow Region 2's Modeling Work Plan and be subject to peer review consistent with the May 2007 RI/FS AOC.	The Region's compliance with CSTAG's 2008 recommendations is unclear. CSTAG suggested that "the Region provide more discussion on the uncertainties in the EMBM and clearly explain any proposed remedy in light of these uncertainties." While the Region claims to have developed other lines of evidence to support the EMBM, those lines remain suspect. For example, the Region has not used all of the available empirical data and does not have a final, complete model that complies with its own 2006 Modeling Work Plan.
7. Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.	**Inconsistent**	Region 2's failure to follow risk management principles and incorporate all available data in its Draft FFS, including background and reference data, have led the Region to a series of incorrect conclusions related to its remedial investigation, CSM, and Draft FFS alternatives. This continues to be the case as evidenced by model results predicting sediment concentrations of 2,3,7,8-TCDD in the range of 1 and 10 ppt in surface sediments following completion of their two proposed dredging alternatives. These predicted post-remediation concentrations, however, are not realistic and thus, are not achievable. Moreover, without a valid CSM, applying risk management principles to set achievable risk-based goals, to develop and analyze remedial alternatives, and to select a remedy that efficiently and effectively reduces unacceptable risks to human health and ecological receptors while minimizing short-term impacts is not possible.	**Consistent**	To develop the Alternative Remedy, the CPG employed realistic assumptions, based on multiple lines of evidence and site-specific data, or data gathered from comparable sites. The targeted areas were selected because they are responsible for much of the human and ecological risk, as they contain contaminants at concentrations significantly above urban background levels, present a potential ongoing source of contamination to other locations of the River, and are inhibiting the natural recovery rates in the River.	The Region has failed to comply with CSTAG's 2008 recommendations. In particular, CSTAG noted that the Region's "projections of post-cleanup sediment concentrations appear unrealistically low. The CSTAG supports the Region's recent decision to reevaluate the level of post-remediation residual risk by incorporating more reasonable estimates of recontamination resulting from dredging and capping the lower eight miles. CSTAG also supports a more robust assessment of the potential for post-cleanup recontamination . . ." The Region continues to use unrealistic estimates for recontamination, which results in a flawed analysis that would spend millions if not billions of dollars to remediate a segment of the River that will be recontaminated.
8. Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.	**Inconsistent**	The Stakeholder Summary provide that: "Preliminary Remediation Goals (PRGs) are being developed for sediment and fish media to protect the human and ecological receptors evaluated in the risk assessments. They are being compared to background concentrations coming over Dundee Dam… More details on PRGs will be provided in the FFS." However, Region 2 does not rely upon the background and reference data that Region 2 has directed the CPG to collect above Dundee Dam.	**Consistent**	The Sediment Guidance recognizes that "the attainment of sediment cleanup levels may not coincide with the attainment of [remedial action objectives ("RAOs")]… Where cleanup levels have been achieved but progress towards meeting RAOs is not as expected, the five-year review process… should be used to assess whether additional actions are needed." *Id.* at 2-17. The CPG's model under development will be used to estimate the time to achieve protectiveness from implementation of the Alternative Remedy. Based on the CPG's understanding of the system and employing the iterative approach, it is anticipated that the time to do so will be comparable to that proposal in the Draft FFS.	The Region's compliance with CSTAG's 2008 recommendations is unclear. CSTAG states that because "it will take many years or even decades to achieve Remedial Action Objectives, both long-term and short-term or interim remediation goals should be developed for fish and crab tissue" and that the Region's "risk reduction projections should be clearly and transparently communicated to affected stakeholders." Region 2 has developed three RAOs for the Draft FFS that identify generalized and non specific reductions in risk to humans and ecological receptors and the reduction of mobility of contaminants, but do not address the time frame in which they may be accomplished.

Appendix 1
Draft FFS Versus Alternative Remedy Consistency with Contaminated Sediment Principles

[A] Contaminated Sediment Management Principles	[B] Draft FFS	[C] Comments Regarding Draft FFS	[D] Alternative Remedy	[E] Comments Regarding Alternative Remedy	[F] Region 2's Compliance with CSTAG's 2008 Recommendation
9. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.	**Generally Inconsistent**	The 2007 Draft FFS identified the fish consumption advisories but did not appropriately evaluate the effectiveness of these institutional controls by failing to utilize the Tierra peer-reviewed angler survey that was completed for this site and the CPG peer-reviewed angler survey currently underway. Further, the principal risk identified by Region 2 relates to the consumption of contaminated fish; a risk currently being addressed by institutional controls. The Draft FFS alternatives would do nothing to address this risk in the short-term or alleviate the need for fish consumption advisories.	**Consistent**	The Alternative Remedy will take advantage of the site-specific angler survey data to evaluate the effectiveness and limitations of fish consumption advisories. Data on fishing and angler behaviors will inform risk evaluations and inform opportunities for maximizing effectiveness of institutional controls.	The Region has failed to comply with CSTAG's 2008 recommendations. CSTAG recommended "further outreach efforts to bolster the effectiveness of the existing fish consumption advisory for fish and crabs." The CPG is not aware of any efforts on the part of the Region to comply with this recommendation. Yet, fish consumption is the principal risk identified by EPA, and the Draft FFS alternatives will do nothing to alleviate the need for these institutional controls.
10. Design Remedies to Minimize Short-term Risks While Achieving Long-Term Protection.	**Inconsistent**	The Draft FFS does not adequately identify or consider the short term-risks that are associated with its implementation, including the inevitable resuspension, release and residuals which would occur while dredging 4.6 MM – 9.6 MM CY with duration of 6-11 years (more realistically under the CPG's calculations, 20-30 years), as well as the disruption to the community created by transporting materials to cap 8 miles of River and to transport and dispose of the significant volume of dredged material. Moreover, by any definition (6 – 11 years or 20 – 30 years), these impacts are not "short-term."	**Consistent**	The Alternative Remedy will achieve significant risk reduction relatively quickly by focusing on specific areas with elevated surficial sediment concentration that are inhibiting the natural recovery of the River. The remaining areas of the sediment bed in the LPRSA will not be disturbed, which will minimize resuspension of contaminated sediments. Faster implementation will result in less adverse impacts on recreational uses of the River, road traffic, noise, and air pollution.	The Region has failed to comply with CSTAG's 2008 recommendations. CSTAG "supports the Region's recent decision to reevaluate potential short-tem risks from sediment resuspension and contaminant release resulting from remedy implementation." The Region continues to use unrealistic estimates for recontamination, which results in an underestimation of the recontamination that is likely to occur.
11. Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness.	**Inconsistent**	In contrast to the Sediment Guidance and this Principle #11, the Draft FFS provides for a *final* bank-to-bank remedy of the lower 8 miles of the LPRSA, without considering the natural recovery of the River – which its own modeling results demonstrate – or implementation issues associated with the Draft FFS alternatives.	**Consistent**	Employing adaptive management principles, if subsequent monitoring following implementation of the Alternative Remedy indicates that the River is not improving as expected, additional remedial activities will be evaluated to further support and enhance the rate of recovery of the River.	The Region's compliance with CSTAG's 2008 recommendations is unclear. CSTAG stated that before "implementing any action, the Region should clearly establish baseline conditions that will be used to evaluate remedy effectiveness." As noted, the Region has not considered critical background and reference data collected by the CPG. The extent to which the Region has considered this issue is not currently known.

TABLE 3
Lower Passaic River Bridges for RMs 0.0 to 8.0

Bridge Name	River Mile	Bridge Type	Maximum Clearance (ft)	
			Horizontal	Vertical [1]
Central Railroad of NJ (not in use)	0.91	Lift (dismantled)	145	NA
Lincoln Highway Bridge (US-1 Truck)	1.57	Lift deck	300	45 (140)
Pulaski Skyway (Rte. 1 & 9)	1.75	Fixed span	520	140
Point-No-Point Conrail	2.33	Swing	103	21
NJ Turnpike Bridge (I-95)	2.41	Fixed span	352	105
Jackson Street Bridge (Frank E. Rodgers Blvd. S./County Rd. 697)	4.37	Swing	72	20
Amtrak Dock Bridge	4.75	Lift deck	200	29 (143)
Penn RR at Market Street	4.75	Draw	75	21
Penn RR at Center Street	4.75	Draw	80	10
Bridge Street Bridge	5.41	Swing	80	12
Morristown Line RR Bridge/(Newark-Harrison) Erie Swing Bridge	5.57	Swing	77	20
Stickel Bridge (I-280)	5.61	Lift deck	200	40 (140)
Clay Street Bridge (Central Ave.)	5.83	Swing	75	13
Fourth Ave Conrail Bridge	6.07	Single-leaf truss bascule (fixed open)	126	12
Erie/Montclair-Greenwood Lake RR Bridge (West Arlington Street Bridge)	7.81	Fixed rail (decommissioned swing)	48	40

Source: Lower Passaic River Commercial Navigation Analysis Rev 2 (USACE, 2010); Lower Resolution Coring Characterization Summary, Lower Passaic River Study Area RI/FS (AECOM, 2011).
Notes: 1) Maximum vertical clearance at low tide.

TABLE 4
Alternative 2—Comparison of Project Duration Estimates to Dredge RM 0 to 8

Parameter	Region 2	CPG	Comments
Dredge Production (CY/day per dredge)		3,321	RM 0 to 2.6: 20 CY bucket
		1,660	RM 2.6 to 4.6: 10 CY bucket
		693	RM 4.6+: 5 CY bucket
	2,000		RM 0 to 8
Number of Dredges		2	RM 0 to 2.6: Limited to two dredges and associated barges because width of navigation channel restricts safe passage of marine equipment (dredge plants and barges) and to minimize post-dredge recontamination.
		2	RM 2.6 to 4.6: Limited to two dredges and associated barges because navigation channel width restricts safe passage of marine equipment (dredge plants and barges) and to minimize post-dredge recontamination.
		1	RM 4.6+: Limited to one dredge and associated barges because barge transport rate is restricted by bridges and navigational design standards limit number of dredges/barges in river above RM 4.6.
	3		RM 0 to 8 (2007 FFS Alternative 1)
Dredge Daily Operation (hrs/day)	24 (2007 FFS text page 4-11)	24	Restricting dredging operations to 12 hours per day would reduce dredge production rates and, therefore, increase project duration.
	12 (2007 FFS Appendix J page J-19)		
Dredge Weekly Operation (days/week)	5	6	
Fish Window (weeks/year)	0	17	Fish Window: March 1 through June 30 (17 weeks)
Dredge Season (weeks/year)	40	23	40 minus 17 equals 23 weeks per year to account for fish window
Resuspension Controls	BMPs only	BMPs only	Details of BMPs (such as bucket retrieval speed) could have a significant impact on dredge production rate and, therefore, project duration.

TABLE 4
Alternative 2—Comparison of Project Duration Estimates to Dredge RM 0 to 8

Dredging Sequence	Unclear if dredging sequence (upstream to downstream) and resuspension impacts were considered in FFS; unclear if physical limitation or practicality of dredging multiple reaches concurrently was considered.	Upstream to downstream; only dredging in one river reach at a time (RMs 0 to 2.6, 2.6 to 4.6, or 4.6+)	Upstream to downstream dredging and dredging in one reach at a time to minimize post-dredge recontamination.
Barge Transport Rate to Processing	Restrictions to barge transport rate not discussed in FFS. There are bridge restrictions (maximum vertical clearance) and USACE nav. restriction for two-way traffic (max. barge width and length).	Barge transport rate not limited with two dredges operating	RM 0 to 2.6: 2 – 2,500 CY hopper barges (260 ft long by 52 ft wide) for each dredge for a total of 4 barge loads (i.e., 10,000 CY sediment & excess water) per day
		Barge transport rate not limited with two dredges operating	RM 2.6 to 4.6: 2 - 1,500 CY hopper barges (195 ft long by 35 ft wide) for each dredge for a total of 4 barge loads (i.e., 6,000 CY sediment & excess water) per day
		Barge transport rate not limited with one dredge operating	RM 4.6+:4 – 250 CY hopper barges (130 ft long by 35 ft wide) for a total of 4 barge loads (i.e., 1,000 CY) per day. Queue full and empty barges and move under bridges during low tide without opening bridges
Sediment Processing Capacity (in situ CY/day)	Sediment processing rates not discussed in FFS—cost and logistic considerations as well as where to locate a facility of the size required.	6,641	Equals maximum of the daily dredge rate x associated number of dredges; capacity equal to Fox River and Hudson River processing facilities
Processed Sediment Transport and Disposal Capacity (in situ CY/day)	Sediment processing rates not discussed in FFS—cost and logistics considerations as well as where to locate a facility of the size required.	6,641	Assumes transport and disposal facilities can accommodate sediment processing rate
Sediment Volume (CY)		5,755,000	RM 0 to 2.6
		2,142,000	RM 2.6 to 4.6
		1,703,000	RM 4.6+
	9,600,000	9,600,000	Total

TABLE 4
Alternative 2—Comparison of Project Duration Estimates to Dredge RM 0 to 8

Dredging Duration with Fish Window (years)		6.3	RM 0 to 2.6
	NA	4.7	RM 2.6 to 4.6
		17.8	RM 4.6+
		1.0	Finish backfilling after dredging
		29.8	Total
Dredging Duration without Fish Window (years)		3.6	RM 0 to 2.6
		2.7	RM 2.6 to 4.6
		10.2	RM 4.6+
		1.0	Finish backfilling after dredging
	11	17.5	Total

TABLE 5
Alternative 3—Comparison of Project Duration Estimates to Dredge RM 0 to 8

Parameter	Region 2 2007 FFS and Feb. 2011 FFS Alternatives Slides	CPG	Comments
Dredge Production (CY/day per dredge)		3,321	RM 0 to 2.6: 20 CY bucket; 3-minute cycle time
		1,660	RM 2.6 to 4.6: 10 CY bucket; 3-minute cycle time
		693	RM 4.6+: 5 CY bucket; 3.5-minute cycle time
		431	Armor & Mudflats: 3 CY bucket; 3.5-minute cycle time
	2,000		RM 0 to 8
Number of Dredges		2	RM 0 to 2.6: Limited to two dredges and associated barges because width of navigation channel restricts safe passage of marine equipment (dredge plants and barges) and to minimize post-dredge recontamination.
		2	RM 2.6 to 4.6: Limited to two dredges and associated barges because navigation channel width restricts safe passage of marine equipment (dredge plants and barges) and to minimize post-dredge recontamination.

TABLE 5
Alternative 3—Comparison of Project Duration Estimates to Dredge RM 0 to 8

		1	RM 4.6+: Limited to one dredge and associated barges because barge transport rate is restricted by bridges and navigational design standards limit number of dredges/barges in river above RM 4.6.
	2		RM 0 to 8 (2007 FFS Alternative 4)
Dredge Daily Operation (hrs/day)	24 (2007 FFS text page 4-11) 12 (2007 FFS Appx J page J-19)	24	Restricting dredging operations to 12 hours per day would reduce dredge production rates and, therefore, increase project duration.
Dredge Weekly Operation (days/week)	5	6	
Fish Window (weeks/year)	0	17	Fish Window: March 1 through June 30 (17 weeks)
Dredge Season (weeks/year)	40	23	40 to 17 = 23 weeks/year to account for fish window
Resuspension Controls	BMPs only	BMPs only	Details of BMPs (such as bucket retrieval speed) could have a significant impact on dredge production rate and, therefore, project duration.
Dredging Sequence	Unclear if dredging sequence (upstream to downstream) and resuspension impacts were considered in FFS; unclear if physical limitation or practicality of dredging multiple reaches concurrently was considered.	Upstream to downstream; only dredging in 1 river reach (RM 0 to 2.6, 2.6 to 4.6, or 4.6+) at a time	Upstream to downstream dredging and dredging in one reach at a time to minimize post-dredge recontamination.
Barge Transport Rate to Processing	Restrictions to barge transport rate not discussed in FFS. There are bridge restrictions (maximum vertical clearance) and USACE navigation restrictions for two-way traffic (maximum barge width and length).	Barge transport rate not limited with two dredges operating	RM 0 to 2.6: 2 – 2,500 CY hopper barges (260 ft long by 52 ft wide) for each dredge for a total of 4 barge loads (i.e., 10,000 CY sediment & excess water) per day

TABLE 5
Alternative 3—Comparison of Project Duration Estimates to Dredge RM 0 to 8

		Barge transport rate not limited with two dredges operating	RM 2.6 to 4.6: 2 - 1,500 CY hopper barges (195 ft long by 35 ft wide) for each dredge for a total of 4 barge loads (i.e., 6,000 CY sediment & excess water) per day RM 4.6+: 4 – 250 CY hopper barges (130 ft long by 35 ft wide) for a total of 4 barge loads (i.e., 1,000 CY) per day. Queue full and empty barges and move under bridges during low tide without opening bridges
		Barge transport rate not limited with one dredge operating	
Sediment Processing Capacity (in situ CY/day)	Sediment processing rates not discussed in FFS—cost and logistics considerations as well as where to locate a facility of the size required.	6,641	Equals maximum of the daily dredge rate x associated number of dredges; capacity equal to Fox River and Hudson River processing facilities
Processed Sediment Transport and Disposal Capacity (in situ CY/day)	Transport and disposal rates not discussed in FFS—cost and logistics associate with transporting and disposing of anticipated volume of sediment.	6,641	Assumes transport and disposal facilities can accommodate sediment processing rate
Sediment Volume (CY)		2,313,000	RM 0 to 2.6
		32,000	RM 0 to 2.6 Armor & Mudflats
		605,000	RM 2.6 to 4.6
		298,000	RM 2.6 to 4.6 Armor & Mudflats
		745,000	RM 4.6+
		307,000	RM 4.6 Armor & Mudflats
	4,300,000	4,300,000	Total (Feb. 2011 FFS Alternatives "Capping with Some Dredging" and 2007 FFS Alternative 4)
Dredging Duration with Fish Window (years)		2.5	RM 0 to 2.6
		0.5	RM 0 to 2.6 Armor & Mudflats
		1.3	RM 2.6 to 4.6
		2.5	RM 2.6 to 4.6 Armor & Mudflats
		7.8	RM 4.6+
		5.2	RM 4.6 Armor & Mudflats
		1.0	Finish backfilling and capping
		20.2	Total

TABLE 5
Alternative 3—Comparison of Project Duration Estimates to Dredge RM 0 to 8

Dredging Duration without Fish Window (years)		1.5	RM 0 to 2.6
		0.3	RM 0 to 2.6 Armor & Mudflats
		0.8	RM 2.6 to 4.6
		1.4	RM 2.6 to 4.6 Armor & Mudflats
		4.5	RM 4.6+
		3.0	RM 4.6 Armor & Mudflats
		1.0	Finish backfilling and capping
	6	12.4	Total
	4 (2007 FFS Appx J page J-19)		RM 0 to 8; 5 years dredging and capping (Feb. 2011 FFS Alternatives "Capping with Some Dredging"); "Restrictions on remediation activities ... could result in longer project durations, or require additional equipment for schedule purposes. For purposes of this analysis, it has been assumed that dredging restrictions (fish windows) would be waived" (2007 FFS).

Appendix 4

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Appendix 5

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February 1, 2011

Via Electronic and Overnight Mail

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Subject: Lower Passaic River Study Area Focused Feasibility Study

Dear Mr. Ells:

I write as Coordinating Counsel for the Lower Passaic River Study Area Cooperating Parties Group (CPG). The CPG has been informed that, on February 2, Region 2 will provide the Contaminated Sediment Technical Advisory Group (CSTAG) with an update on (1) the current form of its Focused Feasibility Study (FFS) and (2) the status of the 17.4-mile Remedial Investigation/Feasibility Study (RI/FS), which is being conducted by the CPG.

As we understand it, the revised FFS will propose a *final* remedy for the sediments in the lower eight miles of the Lower Passaic River Study Area (LPRSA). However, pursuant to an Administrative Settlement Agreement and Order on Consent, which became effective on May 8, 2007, the CPG is currently completing a comprehensive RI/FS of the sediments, biota and surface waters in river miles (RM) 0-8 as part of the agreed-upon RI/FS for the *entire* 17.4 miles of the LPRSA.

The RI/FS and the FFS need to be considered together and ultimately integrated. The CPG commends CSTAG for taking that approach with this update. Indeed, the lower eight miles of the LPRSA cannot be separated from the upper nine miles; they are interdependent because of the potential for both upstream and downstream migration of contaminants and the widespread distribution of COPCs. Moreover, consistent with EPA's sediment management principles, the feasibility study must give consideration to the control of sources within the entire Passaic River watershed as well as the other waterways of the greater Newark Bay Complex to ensure that a sustainable remedy is implemented.

The CPG is committed to moving the RI/FS forward as expeditiously as possible, consistent with the application of the USEPA's Contaminated Sediment Remediation Guidance, the National Contingency Plan, and sound science. To date, the CPG has made substantial progress by completing numerous data collection efforts, analyzing data and developing hydrodynamic, sediment transport and contaminant fate models, which we urge CSTAG to review carefully as part of any evaluation of a final remedy for a portion of the study area. All validated data collected as part of the LPRSA RI/FS needs to be considered for both the FFS and the RI/FS.

Specifically, CSTAG should review and request detailed evaluations of the following data prior to the full review that it plans to conduct later this year:

- Low Resolution Coring (LRC) and Benthic Sediment Grab Data - The CPG's 2008 LRC[1] and 2009 benthic sediment grab data provided the first opportunity to evaluate natural recovery. That evaluation indicates that surficial sediment concentrations in RMs 1-7 are decreasing for most contaminants when compared to surface sediment data collected in 1995 (Table 1). In addition, the LRC data cores indicate that at many locations highly elevated concentrations (1-2 orders of magnitude greater than the current surface) of COPCs are buried and stable at depths beneath the 1963 Cesium-137 peak (Figure 1).

- Fish and Crab Tissue Data - A preliminary review of PCBs and 2,3,7,8-TCDD detected in fish and crab tissues collected in 2009 shows reductions when compared to historic tissue data (Figures 2, 3 and 4).

The CPG's preliminary evaluation of the most recent, validated tissue data indicates significant decline of COPCs has occurred when compared to historic tissue concentrations, when evaluated on a specific-to-species tissue type basis. The rates of

[1] Based on a comparison of Region 2 dioxin split samples and the CPG's LRC sample results, Region 2 has concluded that the LRC samples are "biased low" for 2,3,7,8-TCDD. The CPG notes that the validation of the EPA's split data was limited to the lowest level of data validation (i.e., "simple forms check") and no additional evaluation of the data has been conducted by EPA to validate the split data set. Furthermore, the March 2010 report prepared by EPA's consultant (CSC) recommends that "for a correction factor to be applied to these data, we [CSC] suggest an examination of the spatial distribution of the samples collected for the splits and for the remainder of the 2008 data, and an examination of the error structure of the CAS measurements, to attempt to learn how the error associated with any correction would be affected". To date, neither of these actions has been completed by Region 2; rather the correction has simply been applied to all LRC 2,3,7,8-TCDD results by Region 2. As such the CPG does not believe the application of the correction factor called for by Region 2 has been adequately justified.

decline of tissue data are relatively consistent with observed declines of surface sediment concentrations (Figures 2, 3 and 4).

Moreover, based on the CPG's preliminary evaluation of all data, the CPG believes that the data have enabled clarification and refinement of the conceptual site model and will provide the basis for a thorough and reasoned feasibility study. Particularly important insights that have been obtained are:

- Identifiable stable and erosional areas (Figure 5) ;
- Discernible patterns of contaminant distribution (Figure 5);
- Demonstrable natural recovery of the sediments and biota (Table 1, Figures 1-4). Burial is the dominant mechanism responsible for natural recovery in the LPR, and has been observed both within and outside of previously dredged areas. High surficial sediment COPC concentrations tend to be located where sedimentation rates are low, suggesting that they may be due to lack of burial and not necessarily to erosion (Figure 5); and
- The importance of regional contamination as evidenced by the similarity for many COPCs of concentrations within and upstream and downstream of the LPRSA.

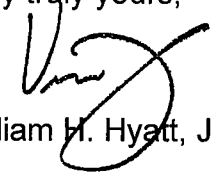
We expect the continued detailed analyses of the LPRSA RI/FS data to support the identification of remedies that with less extensive remediation achieve benefits comparable to those identified in the FFS. Such targeted remedies will have greater short-term effectiveness (less resuspension) and improved implementability. The CPG has informed the Region that it has retained a contractor to conduct the FS portion of the 17.4-mile RI/FS and has begun work on that phase of the project. At Region 2's request, the CPG is now working on identifying other remedies appropriate for the lower eight miles and plans to present such alternatives to the Region in the coming months. The CPG will also provide this information to CSTAG to consider during its final review of the FFS.

Region 2 provided the CPG with a copy of its document titled "CSTAG Briefing Memo: Lower Passaic River – 17 Mile RI/FS" (dated 1/28/11) ("Memo"), which includes a discussion of its conceptual site model (CSM). The CPG appreciates this courtesy; however, the CPG disagrees with a number of statements and conclusions in the Memo, particularly several key aspects of the "EPA Region 2 Perspective" on the preliminary CSM. The CSM for the 17-mile study area is still under development by the CPG and Region 2. Therefore, the CPG believes that a full and detailed review of the

status of the RI/FS is a critical component of the full CSTAG/NRRB review planned for later this year. By then, more work will have been completed on the RI/FS resulting in a correspondingly better understanding of the CSM.

The CPG appreciates your consideration of this request to conduct a full and detailed review of the status of the RI/FS, including but not limited to, those issues listed in Attachment 1.

Very truly yours,



William H. Hyatt, Jr.

cc: Mr. Eric Schaaf, Esquire, EPA Region 2
Ms. Sarah Flanagan, Esquire, EPA Region 2
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Mr. Raymond Basso, EPA Region 2
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CPG Members

Attachment 1

CPG Comments on Statements in the
EPA Region 2 CSTAG Briefing Memo Lower Passaic River – 17 Mile RI/FS

The EPA Region 2 CSTAG Briefing Memo presents numerous positions and conclusions to which the CPG does not agree. To better inform CSTAG, Attachment 1 identifies some, but not all, of the CPG's concerns with Region 2's CSTAG Briefing Memo. While we understand that Region 2's positions rely heavily on historical data sets, the CPG comments in Attachment 1 are based on the more comprehensive data collected by the CPG during the RI/FS for the entire 17.4 miles of the LPR. The RI/FS data have been shared with Region 2.

Region 2 Statement: *When a high flow event occurs, inches to feet of sediments may be eroded or deposited in localized areas.*

CPG Comment: Comparison of sequential multibeam bathymetric surveys and evaluation of the sediment transport model results do not support this statement. There are limited locations in the bathymetric depth difference between the 2008 and 2010 surveys that indicate meaningful change (greater than 1 foot, where change less than 1 foot is within the uncertainty of the data). Several locations where the channel was deeper in 2010 are associated with recent dredging activities. The limited areas where changes were observed are consistent with geomorphic behavior (e.g., some erosion was observed along the outer bends). The sediment transport model results of the March 2010 high flow event support these observations, where limited (<0.5 cm) erosion was observed over the lower eight miles of the LPR, with localized areas of higher predicted erosion (on the order of 1 to 5 cm) in high energy areas.

Region 2 Statement: *Bathymetric comparisons between 2006 and 2010 (EPA Attachment 1) show that while net deposition is still dominant in the lower 2 miles, a substantial portion of the LPR upstream of RM 2 is net erosional.*

CPG Comment: The figures in EPA's Attachment 1, which are a comparison between 2004 single beam bathymetry transects and 2010 multibeam bathymetry, indicate net erosion in the main channel between RM 2 and RM 7. This result is inconsistent with other comparisons of bathymetric data, particular comparison of sequential multibeam surveys, which indicate only limited erosion. Comparison of single beam and multibeam data are expected to contain considerable uncertainty, given the different measurement techniques. Given this uncertainty, bathymetry data need to be evaluated together with other lines of evidence, including the hydrographic flow record, sediment core profiles, numerical model results, and water column data. These additional lines of evidence do not support the observation that measurable erosion occurred over the majority of the river over a 6-year period.

Region 2 Statement: *The river is no longer continuously depositional especially above RM 2, suggesting that contaminant concentrations will no longer be significantly attenuated through burying and dilution processes going forward.*

CPG Comment: Multiple lines of evidence indicate that the river continues to be net depositional and that burial and recovery of the surficial sediments will continue until surficial concentrations equilibrate to background concentrations. As discussed above, the data and the model results indicate a net depositional environment, with limited erosion during flow events, and that surficial concentrations have declined over the past 15 years (see below).

Region 2 Statement: . . . *contaminant concentrations have shown little decline over [the] 15-year timeframe [from 1995 to 2009].*

CPG Comment: This statement is not correct because there have been consistent declines in average concentration for almost all COPCs. For the sediments in RM 1-7, the average 0-15 cm surface layer concentrations for 12 of 13 COPCs identified in the 2007 Early Action Focused Feasibility Study showed declines between 1995 and 2008; 7 of the changes were individually statistically significant and the finding of declines in 12 of 13 cases makes the overall trend statistically significant. The sediment data show that recovery has been fastest for COPCs whose concentrations are greater than regional background and is relatively slower for COPCs whose concentrations are close to regional background. [Table 1]

CPG's preliminary evaluation of most recent, validated tissue data indicates significant decline of COPCs have occurred when compared to historic tissue concentrations, when evaluated on a specific-species/tissue type basis; rates of decline of tissue data are comparable with observed declines of surface sediment concentrations. [Figures 2, 3 and 4]

EPA Region 2 temporal comparisons are based on measures of median (geometric mean and median). This approach skews the comparison because it under weighs the high concentrations found in the early survey but not the later survey. The average is the more appropriate statistic because it is the measure of the exposure point concentration relevant for risk assessment.

Region 2 Statement: *Average concentrations of 2,3,7,8-TCDD, total PCBs and metals (mercury, copper and lead) are all significantly higher than the Upper Passaic River, Newark Bay and tributaries... This suggests the resuspension of sediment in the main stem of the Passaic River as the major on-going source of these contaminants especially 2,3,7,8-TCDD in surface sediments.*

CPG Comment: This statement is premature and likely incorrect based on Region 2's current determination of background concentrations and 2008 average concentrations of COPCs in the lower seven miles. The CPG is presently engaged in a full evaluation of the relative contributions of COPC sources to the LPR, including sampling of CSO/SWO, surface water sampling in the LPRSA and NBSA to support the determination of appropriate loadings from non-point urban sources, and contributions from Newark Bay, the upper Passaic River, and associated tributaries. The CSO/SWO and surface water sampling, beginning in early 2011, will provide significant amounts of site-specific data to allow this evaluation to be properly completed, as part of the RI/FS.

Region 2 Statement: *An evaluation of ongoing contaminant sources suggest the resuspension of LPR sediments as the likely major ongoing source of COCs.*

CPG Comment: The CPG is presently engaged in a full evaluation of the relative contributions of COPC sources to the LPR, including sampling of CSO/SWO, surface water sampling in the LPRSA and NBSA to support the determination of appropriate loadings from non-point urban sources, and contributions from Newark Bay, the upper Passaic River, and associated tributaries. The CSO/SWO and surface water sampling, beginning in early 2011, will provide significant amounts of site-specific data to allow this evaluation to be properly completed, as part of the RI/FS.

Region 2 Statement: *COCs are coincident with fine grained sediments*

CPG Comment: The data do not support this statement. There is only a weak relationship between grain size and surficial COPC concentrations. Locations with less than 20 percent fines generally have lower mean surficial COPC concentrations than locations with greater than 20 percent fines. However, it appears that burial rate is a stronger determinant of COPC concentration than grain size. The highest concentrations tend to be associated with locations with the lowest burial rates regardless of grain size. Consequently, many fine grained sediments with high burial rates have relatively low surficial sediment COPC concentrations.

Region 2 Statement: *Surface concentrations of COCs throughout the study area significantly exceed risk based levels for human health and ecological receptors*

CPG Comment: Consistent with EPA guidance, the human health (HHRA) and ecological risk assessments (ERA) for the LPRSA RI/FS should use site-specific assumptions to assess risk and support the evaluation and ultimate selection of remedial alternatives. Site-specific risk assessments are being conducted by the CPG for the entire LPRSA. The overall evaluation of risk to humans and ecological receptors is highly dependent on the proper identification of site-specific environmental conditions and exposure pathways; the application of default and overly conservative assumptions may significantly overestimate risk to receptors. Such assumptions were used to generate the risks cited by EPA Region 2.

For example, the average PCB concentration in the LPRSA of about 0.7 ppm is lower than the cleanup level at most other Region 2 Superfund Sites (e.g., Hudson River, St. Lawrence River). Similarly, the average mercury concentration of 1.9 ppm is only modestly higher than the cleanup goal of 1 ppm at the Region 2 site on the Peconic River. Furthermore, recent sediment and tissue data indicates a decrease in TCDD concentrations and a corresponding decrease in associated risk.

Region 2 Statement: *The LPR is approaching quasi equilibrium conditions whereby infilling with "cleaner" sediments cannot be relied upon to continue to bury and attenuate the high levels of COCs in the surface sediment.*

CPG Comment: Burial has been the dominant mechanism responsible for natural recovery in the LPR, and the inverse correlation between 2008 surficial sediment COPC concentration and burial rate is evidence that burial remains an important mechanism for recovery [Figure 5]. Ongoing sources, including the Upper Passaic River, Newark

Bay and inputs from urban sources, are controlling the extent to which natural recovery can occur for some COPCs; based on the relative contributions from these sources, surficial COPC concentrations are equilibrating to these background levels [Figure 6].

Region 2 Statement: . . . *while the data suggests a fairly stable sediment inventory on a gross scale, and especially at depth, localized erosion during high flow events will continue to add to surface contaminant levels by resuspending sediments containing COCs.*

CPG Comment: CPG generally concurs with this observation, and has been engaged in the identification of these specific areas within the LPR. Initial evaluations indicate the isolation of these areas may provide comparable levels of risk reduction, and will not result in the unnecessary re-suspension of concentrated sediments associated with extensive and long-term "bank-to-bank" remedial alternatives.

Appendix 6
Draft FFS versus Alternative Remedy Consistency with NCP Criteria for Selection

Nine Criteria for Evaluation	Draft FFS	Comments regarding Draft FFS	Alternative Remedy	Comments regarding Alternative Remedy
1. Overall Protection of Human Health and the Environment.	**Inconsistent**	The Stakeholder Summary does not quantify how the remedial alternatives under consideration in the Draft FFS would be protective of human health and the environment, yet Region 2 prematurely screens out a focused capping alternative on the basis that it is not protective. However, it is currently not possible for Region 2 to determine protectiveness for a *final* remedy for the FFS Study Area. The Region has failed to consider critical data that is and will become available under the RI/FS, which leads it to inaccurate conclusions (see Section II(A)(I) of the CPG's comments, which outlines the data being ignored by Region 2), and the contaminant fate and transport model used for the Draft FFS is flawed and incomplete, and does not accurately represent known transport processes. In addition, the Region apparently gave no consideration to the adaptive management approach or the possibility of combining the active alternatives with other measures, such as monitored natural recovery, to achieve protectiveness.	**Consistent**	The Alternative Remedy's iterative approach is protective of human health and the environment, and it is consistent with the Sediment Guidance. The Sediment Guidance recognizes that "the attainment of sediment cleanup levels may not coincide with the attainment of [remedial action objectives ("RAOs")]… Where cleanup levels have been achieved but progress towards meeting RAOs is not as expected, the five-year review process… should be used to assess whether additional actions are needed." 2-17. The CPG's model under development will be used to estimate the time to achieve protectiveness from implementation of the Alternative Remedy.
2. Compliance with ARARs.	**Inconsistent**	Region 2 has failed to complete an analysis on ARARs. As to NOAA's fish windows, for example, given the anticipated duration of dredging activities, Region 2's premise that fish window restriction would be waived for the 6 - 11 years estimated by Region 2, or the much more realistic 20- 30 years estimated by CPG, is unjustified. Region 2 further fails to consider siting and permitting issues associated with implementation of the Draft FFS alternatives.	**Consistent**	It is anticipated that the Alternative Remedy will be ARAR-compliant, upon completion. Following implementation of the Alternative Remedy, ongoing monitoring will be performed to assess the recovery of the system, and future remedial actions, if necessary, may be adapted to achieve ARARs and the desired improvements of the LPRSA. CERCLA also provides that ARARs may be waived when "the remedial action is only part of a total remedial action that will attain such level or standard of control when completed." *See* 42 U.S.C. 9621(d)(4)(A).
3. Long-term Effectiveness and Permanence.	**Inconsistent**	The Draft FFS fails to address ongoing sources, and thus, the FFS Study Area is likely to be subject to recontamination. • Using the largest and most current data set, the CPG has estimated an average surface concentration of 1,000 ppt of TCDD above RM 8. This would serve as a continuing source of TCDD recontamination to the FFS Study Area. • As TCDD represents the largest component of human health risk, continued recontamination of RM 0-8 would be contrary to the first NCP criteria; that is, continued sources of TCDD would not maintain protection of human health and the environment. • Based on the CPG's understanding of the data, since the Upper Passaic River and Newark Bay are sources of sediment to the LPR, the fact that these areas have COPC concentrations about equal to (or greater than) those in the LPRSA means they must be controlling surface sediment concentrations in the LPRSA. This is supported by the latest data which show that, with the exception of TCDD, concentrations of all other COPCs in surface sediment are approaching regional background concentrations. ▪ Region 2 relies on a limited set of data (i.e., CARP and 2008 MPI data) and fails to wait for and consider the data	**Consistent**	The CPG developed the Alternative Remedy using multiple lines of evidence based on all of the data available to date. The Alternative Remedy will address areas of the LPRSA with high concentrations of the important COPCs, as well as areas of the River that are potential ongoing sources of contaminants, while minimizing the resuspension of contaminants. In encompassing the entire 17 mile LPRSA, it will also reduce re-contamination of the less contaminated areas. Following implementation, the river system can be expected to recover at a rate equal to or greater than current recovery. If subsequent monitoring indicates that the River is not improving as expected, additional remedial activities will be evaluated to further support and enhance the rate of recovery of the River.

Appendix 6
Draft FFS versus Alternative Remedy Consistency with NCP Criteria for Selection

Nine Criteria for Evaluation	Draft FFS	Comments regarding Draft FFS	Alternative Remedy	Comments regarding Alternative Remedy
		from the Tierra CSO Phase 1 Study that it has approved and signed an AOC with Tierra to perform. The Phase 1 data collection is currently scheduled to start in late 2012 or early 2013. ▪ Region 2 fails to consider a significant volume of sediment, surface water and other environmental data that has collected. All these data have been deemed necessary by Region 2 in order to complete the RI/FS, which includes assessing the long-term effectiveness and permanence of remedial actions.		
4. Reduction of Toxicity, Mobility, or Volume Through Treatment.	**Generally Inconsistent**	The Draft FFS's exclusion of significant amounts of data, representing hundreds of sampling locations where sediment, tissues and water have and will be collected between 2008 and 2013, leads it to incorrect assumptions and conclusions related to ongoing sources, resuspension, and redeposition. The result is that over time, recontamination of previously dredged and capped/filled areas will occur, negating the initial reduction of contaminant concentrations in the River.	**Consistent**	The Alternative Remedy was developed using all available data and multiple lines of evidence, and will continue to be refined as the RI/FS is completed. Moreover, the Alternative Remedy addresses the entire 17 miles. It will remove high concentration areas, while minimizing the resuspension of contaminants. The result is that at all times during a 30 year horizon, the Alternative Remedy produces a greater contaminant reduction (expressed in %) than the Draft FFS.
5. Short-term Effectiveness.	**Inconsistent**	Large-scale dredging projects, such as the alternatives presented in the Draft FFS, result in large amounts of contaminated sediments being resuspended. Elevated concentrations of TCDD have been measured in sediments in RM 8-13 and in Newark Bay. Thus, recontamination is inevitable in RM 0-8 as a result of the resuspension from dredging releasing significant additional mass and sediment moving up and down River from tidal action.	**Consistent**	The Alternative Remedy will result in a significant initial reduction in surficial sediment concentration and associated risk. It can be implemented in a fraction of the time than the Draft FFS, and as compared to the Draft FFS, will result in less resuspension, disruption to recreational activities, and destruction of benthic habitat. This reduced implementation time will allow recovery to begin earlier, resulting in improved river conditions much more quickly.
6. Implementability.	**Inconsistent**	Region 2 fails to consider major factors that significantly lengthen the time to complete the Draft FFS preferred alternatives, and which affect its implementability, including: • Dredging must be sequenced, starting upriver and moving downriver to prevent recontamination and impacts to the capping operations. • River width and depth, as well as bridge clearances, limit the size of equipment and number of vessels that can be safely deployed at any one time, especially above RM 4.6, thus reducing the dredging production rate that can be realistically expected. • NOAA's fish migration windows are not likely to be waived and will substantially reduce the number of days per year that dredging or filling can be conducted. • The equipment limitations that apply to dredging will also apply to capping. Above RM 4.6, operations may be limited to either dredging or capping, but not both simultaneously, which would increase the project duration.	**Consistent**	The Alternative Remedy was designed to minimize duration and disruption, and take into account River characteristics and bridge clearances. It will achieve similar risk reduction benefits as the Draft FFS alternatives, but be implemented in a fraction of the time of the Draft FFS.

Appendix 6
Draft FFS versus Alternative Remedy Consistency with NCP Criteria for Selection

Nine Criteria for Evaluation	Draft FFS	Comments regarding Draft FFS	Alternative Remedy	Comments regarding Alternative Remedy
7. Cost.	**Inconsistent**	Region 2 is proposing the most costly sediment remediation ever advocated by an EPA Region, yet has not provided the CPG and other stakeholders with any information on how it calculated costs for two of its three disposal scenarios. Based on the CPG's more supportable duration and implementation estimates, the project costs are significantly greater than estimated by Region 2. Region 2's cost estimates for the Draft FFS preferred active remedial alternatives, assuming the most likely scenario of off-site disposal, range from $1.9 billion to $3.4 billion. However, using more realistic assumptions, the CPG estimates that these costs actually range from $2.0 billion to $5.0 billion. *Thus, Region 2 may be underestimating off-site disposal cost by as much as $1.6 billion – nearly half of Region 2's estimated cost for the entire Deep Dredging alternative*. Given the various uncertainties and the potential for a *$5 billion* remedy, it is incumbent on Region 2 to provide appropriate detail on its cost estimates and demonstrate that it has thoroughly evaluated the underlying assumptions. Moreover, the Draft FFS preferred alternatives are not cost-effective because their costs are not proportional to their effectiveness. 40 CFR §300.430(f)(1)(ii)(D). Thus, the Draft FFS does not comply with the NCP.	**Consistent**	The Alternative Remedy's costs are proportional to its effectiveness, and therefore, it is cost-effective, which is consistent with the NCP. In accordance with the Sediment Guidance, high remedy costs can also lead to a decision to phase a cleanup, such as is suggested by the CPG. While the extent of short-term and long-term benefits is a function of the area remediated, it is not a linear relationship; at some point the remediation of additional areas provides little additional benefit relative to the increased level of effort and attendant cost increase. The areas to be targeted by the Alternative Remedy were selected by considering the range of COPC concentrations where remediation efficiency is maximized. Targeting threshold concentrations below this range will result in a significantly larger effort and increased cost, while producing minimal additional benefit in further risk reduction and enhanced recovery, and creating increased disturbance and resuspension of COPCs over a longer duration.
8. State Acceptance.	**Consistent**	The CPG is not privy to discussions between Region 2 and New Jersey, but based upon public statements, the CPG understands that the State supports the dredging and capping/filling alternatives identified in the Draft FFS. However, there does not appear to be consensus on the three disposal options: Newark Bay CAD, Beneficial Reuse/Local Treatment, and Off-site Disposal. Region 2 appears to support construction and use of the Newark Bay CAD, while New Jersey and the Partner Agencies appear to oppose this option.	**To be determined**	The CPG is committed to working with EPA, New Jersey, and the Natural Resource Trustees to ensure that all viewpoints are considered in the completion of the RI/FS and refinement of the Alternative Remedy.
9. Community Acceptance.	**To be determined**	There does not appear to be consensus among the community on the dredging and capping/backfilling alternatives identified in the Draft FFS. Moreover, there is not consensus among the community stakeholders regarding the three disposal options: Newark Bay CAD, Beneficial Reuse/Local Treatment, and Off-site Disposal. There appears to widespread opposition to a CAD. Local residents appear to be opposed to Beneficial Re-use/Local Treatment, while other stakeholders have suggested the need for a regional treatment facility. Stakeholders have also expressed concern about disposing the sediments in landfills in other communities.	**To be determined**	The CPG is committed to working with EPA, the CAG, local communities and other interested stakeholders to develop the Alternative Remedy. This alternative can be implemented faster and will result in less adverse impacts on recreational uses of the river, road traffic, noise, and air pollution. The CPG has initiated a process to fully inform the CAG and community stakeholders about the Alternative Remedy and additional actions that can benefit the public and enhance use of the River system.